OCT 20 1898 Pk. Econ.

THE IRON TRADE REVIEW

Vol. XXXI. CLEVELAND, O. OCTOBER 20, 1898. CHICAGO, ILL. NUMBER 42

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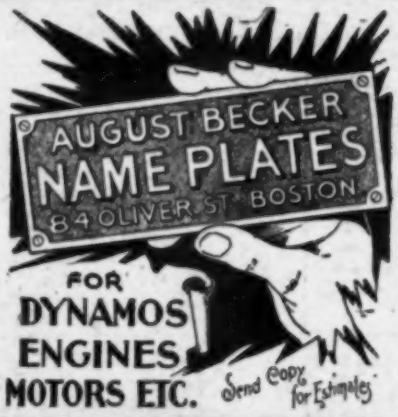

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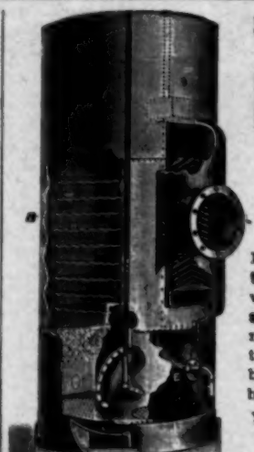

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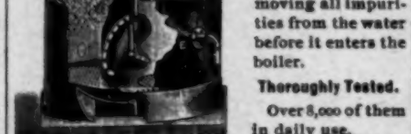

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THE IRON TRADE REVIEW

VOLUME XXXI. CLEVELAND, O. OCTOBER 20, 1898. CHICAGO, ILL. NUMBER 42

THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

A quieter week than those immediately preceding, is the record for the iron market. The experience as to volume and prices is not uniform. Continued firmness in some lines, as in foundry iron, of which production is steadily under consumption, is offset by easier conditions elsewhere, as in Bessemer pig iron, steel billets and some forms of finished steel. Stock statistics for Oct. 1, by the Western Pig Iron Association's report, show a decrease in September of 80,000 tons, coke, anthracite and charcoal irons all participating, the first named contributing 63,000 tons of the total. Southern makers of foundry iron are holding prices at the level recently reached, and it would appear that these prices will be realized in the buying of the next few months. The chief complaint from the Southern market is the inability to make full deliveries of certain grades, and the pinch of car scarcity, felt in several districts, is especially in evidence in Alabama. Of export business there are regular offerings, but the foreign demand for grain from the United States has increased the difficulties of Southern exporters. While shipments are being made on old contracts, the conditions at home and the freight situation cut down on new foreign business. The Central Western market in Bessemer iron and billets is inactive, and the feeling is weaker in both. Steel works are apparently supplied for the balance of the year, and the selling agency of the associated furnaces has scarcely become operative. Iron outside the agreement has sold considerably below the recent $10 price, $9.65, valley, being reported. Billets are $15.50 to $15.75 at maker's mill, with no transactions of importance. Sheet and tin plate bars are easier, $16.75 to $17.25 Pittsburg maker's mill being now quoted on 1899 contracts. There is some abatement of the scarcity which was marked a few weeks ago. The plate market shows the differing situations of the mills, those which are filled on large work quoting over $1 above the market, which is now a shade under 1.10c Pittsburg for tank. Sheets and light plates show more of a struggle for business and quotations vary from $1 to $2 on the ton. Structural mills, with the approach of winter, are gaining perceptibly on order books. The business has been very heavy, this year, in spite of the effect of the war upon new construction. The tonnage of beams and channels alone is estimated to be 100,000 tons more to Oct. 1 than to the same date last year. Railroads are making an effort to cure the extreme demoralization of iron and steel rates prevalent in the past two months—an up-hill undertaking. Certainly conditions have been unsatisfactory to the iron trade, the lack of uniformity outweighing all the concessions. The Federal Steel Co. is now a thing accomplished, and the developments of its attitude on the rail question and on ore and other factors in next year's business will be watched with interest. If a bull campaign on Wall Street is contemplated, its position on iron and steel prices can scarcely be in doubt.

PITTSBURG.

OFFICE OF *The Iron Trade Review and Industrial World*, 801 TRADESMEN'S BUILDING, Oct. 19.

The Knights Templar Triennial Conclave was in complete possession of Pittsburg last week and little or nothing was done in the local trade. Export inquiries come in steadily and are becoming more and more a feature. Bessemer pig iron and steel billets are a trifle lower, and in some lines of finished material it is evident that mill shipments are in excess of current orders.

PIG IRON.—The Bessemer Furnacemen's Association has established its central selling agency in Pittsburg, in the past week, but its market policy has not developed as yet. The movement in pig iron is exceedingly slow, as all consumers are full for some time to come. Bessemer is quoted from $10.25 to $10.50 Pittsburg, offers of outside iron being made at the lower price under the 50c valley freight recently made. Gray forge is rather quiet, being quoted from $9.25 to $9.35, with sales only in small lots. The furnaces that are running on foundry iron report themselves full of orders, some beyond the end of the year. Such quote No. 2 firm at $10.25 but others go lower, the range of the market being from $10 to $10.25. Immediate demand is light. Prices are as follows:

Bessemer, valley furnace	$ 9.90 to 10.00
Bessemer, Pittsburg	10.25 to 10.50
No. 1 Foundry	10.55 to 10.65
No. 2 Foundry	10.00 to 10.25
No. 3 Foundry	9.65 to 9.85
Gray Forge, valley furnace	8.80 to 8.90
Gray Forge, Pittsburg	9.25 to 9.35

BILLETS AND RODS.—While the nominal quotation for billets continues to be $16, an attractive order would get as low as $15.60 and $15.75 makers' mill. Quite a large tonnage has been placed for the first quarter of next year and a less amount for second quarter. Business at the moment is rather quiet, however, as the mills are all nearly filled for this year. Sheet bars are lower, the situation having eased up in the last few weeks. We quote $16.75 to $17.25 on 1899 business. With some mills early deliveries are still difficult. The quotation of $22 still holds for rods. Foreign inquiries for sheet bars, rods and billets are numerous, several sales of less than 1,000 tons having been made lately. The freight question is a source of trouble in this business, as the enormous export movement of grain has stiffened ocean freights to a higher price than duing the Leiter campaign.

IRON AND STEEL SKELP.—Business continues excellent, the demand being steady and prices firm, as follows: Grooved iron skelp, 1.10c to 1.12½c; sheared iron skelp, 1.22½c to 1.25c; grooved steel skelp, 1.22½c to 1.25c; grooved steel skelp, 1.02½c to 1.05c; sheared steel skelp, 1.10c to 1.12½c.

PIPE AND TUBES.—The rush continues unabated and as none of the mills have any stock on hand, the present outlook is for steady running through the winter months. Orders are booked now for delivery six weeks hence and the future looks very promising for upholding present conditions. In the last week one order for 100 miles of line pipe for a Kentucky interest was taken by a Pittsburg mill and another for 30 miles of 10-inch pipe was equally divided between two local mills. There is now pending an order involving altogether 56 miles of 6-inch pipe, which is not likely to be booked unless the parties will consent to 1899 delivery. The manufacturers' chief drawback is his inability to comply with buyers' insistent call for deliveries. The additional discounts of six tens for less and six tens and two and a half per cent off list for car load lots are still quoted. Base discounts are: Butt weld, black, 55 per cent off; lap weld, black, 65 per cent off; butt weld, galvanized, 47½ per cent off; lap weld, galvanized, 52½ per cent off. Discounts on merchant boiler tubes are as

follows: 2¼-inch and smaller, 72½ per cent off; 2½ inch and larger, 75 per cent off. Inserted joint casing is now quoted at 60 off and screw and socket joint casing at 60 and 10 per cent off.

SHEETS.—Most of the mills are in good shape: some of the smaller ones making the only complaints heard. In some cases business hinges on the question of delivery, the mills in question being very comfortable. No. 28 is quoted at 1.65c and galvanized at 80 and 7½ to 80 and 10 per cent off list. It is currently reported that these figures are being shaded, if the business is particularly desirable.

STRUCTURAL MATERIAL.—The week has been uneventful. The closed season is now approaching and a slowing down in building enterprises will have a natural effect on this material. At present the mills are very busy and can run some time without a sign of a break. The year has been an exceptional one, it being estimated that in beams and channels alone the production was 100,000 tons in excess of that of last year, up to the first of the current month. Prices are firm as follows: Beams and channels, 3 to 15 inches, 1.20c; 18 to 24 inches, 1.30c; tees, 1.25c; zees, 1.20c and angles 1.10c. Universal plates alone at 1.15c; with other shapes 1.05c.

PLATES.—The Coolgardie is in *Statu quo*, so far as any official announcement of the destination of the riveted plates is concerned, but there is every expectation that Pittsburg will get a considerable tonnage. The local mills are very busy on home orders and prompt deliveries are out of the question. Prices are as follows: Tank, 1.15c; shell, 1.20c; flange, 1.25c; fire box, 2c and upwards.

FERRO-MANGANESE.—We continue to quote $50 for 80 per cent domestic delivered.

RAILS AND TRACK MATERIAL.—The local interest is running one mill on light rails exclusively, and at the present rate of demand it has plenty to do. Light sections are quoted from $19 to $19.50. Heavy sections are quoted firm at $18. The condition in track materials is unchanged with prices as follows: Spikes, 1.50c; track bolts, 1.65c to 1.70c; splice bars 1.10c to 1.15c; links and pins are quoted from 1.20c to 1.27½c.

SPELTER.—A record is being made for stability in this metal, the present quotation being 4.90c. The price of spelter in the London market is now much higher than any time since 1891. Ore is quoted here at $33, St. Louis.

SPIEGEL.—The quotation continues from $23.50 to $24.

OLD MATERIAL.—A fair business is being done. The largest sale of the week was 1,000 tons of steel rails at $10. Other prices are as follows: Wrought iron scrap, $11.75 net, valley; old iron rails, $13.85 to $14; cast borings, $6; busheling scrap, $9.25, net; car wheels, $10.25, gross; cast scrap, $9; iron axles, $6, net; steel axles $12.50, gross; charcoal scrap, $10, gross; billet and bloom ends, $11; machinery scrap, $9; wrought turnings, $6.75, net.

CHICAGO.

OFFICE OF *The Iron Trade Review and Industrial World.*
1522 MONADNOCK BLOCK, Oct. 19.

There has been very little change in the situation, in any branch of the market, in the week. Sales of pig iron were moderate, while the demand for steel of all kinds keeps up. Consumers of all kinds of material are taking on their contracts as fast as they can get shipments, and mills and furnaces find more difficulty in keeping up with shipments on old contracts than in making new ones.

PIG IRON.—The market has been quiet, with only small sales. Dealers are still looking forward to a heavy movement within a short time, but so far it has not materialized. Foundries are running full, and are taking their iron as fast as it can be shipped to them, but they do not appear to be at all anxious to make contracts for future needs at the present time. Many buyers who placed orders some time ago have had nearly all the iron due them, and it is thought will purchase again soon. Furnaces, both North and South, are very firm in their views and are holding to the figures we quote. The larger Southern furnaces continue to ask the top quotations for their irons.

Lake Sup. Charcoal	$11 50 @ $13 00	Southern Coke No. 3	$10 35 @ 10 60
Local Coke Fdy. No. 1	11 50 @ 12 00	Southern No. 1 Soft	10 85 @ 11 10
Local Coke Fdy. No. 2	11 00 @ 11 50	Southern No. 2 Soft	10 60 @ 10 85
Local Coke Fdy. No. 3	10 75 @ 11 00	Southern Silveries	11 25 @ 11 50
Local Scotch Fdy. No. 1	11 50 @ 12 00	Jackson Co. Silveries	12 50 @ 14 50
Local Scotch Fdy. No. 2	11 00 @ 11 50	Ohio Strong Softeners	12 00 @ 12 50
Local Scotch Fdy. No. 3	10 75 @ 11 00	Alabama Car Wheel	15 00 @ 16 00
Southern Coke No. 1	10 85 @ 11 10	Malleable Bessemer	11 50 @ 12 00
Southern Coke No. 2	10 60 @ 10 85	Coke Bessemer	11 50 @ 12 00

BARS.—There has been a considerable demand for bar iron and steel, coming from nearly all classes of trade, but most of it has been in comparatively small lots. The car builders are good buyers of material, and several good sized contracts of this character have been placed in the past week. The market is unchanged at 1.05c to 1.10c for common iron, 1.10c to 1.20c for guaranteed, and 1.15c to 1.20c for soft steel bars from billet stock.

RAILS AND TRACK SUPPLIES.—The local mills have made no sales of rails in the week. Quotations on rails have been withdrawn until after the New York meeting of makers to be held within the next week or two. Other quotations are as follows: Steel splice bars, 1.15c to 1.25c; track bolts with square nuts, 1.80c to 1.90c; hexagon nuts, 1.90c to 2c; spikes, 1.55c to 1.60c.

BILLETS AND RODS.—No sales of billets are reported, but one sale of 1,000 tons of rods has been made for export. The mills are full of orders for the balance of the year, and can accept no business for delivery in that time. Quotations are nominal at $17 for billets and $22.50 for rods.

CAR ORDERS.—Two or three small orders were given out last week. The demand for car material of all kinds is large. The car works in this vicinity are all full of business for the balance of the year, and some of them have many orders which will carry them into next year.

STRUCTURAL MATERIAL.—Business was somewhat smaller last week, although a very good business was done in small lots. No large contracts were placed. No changes have been made in quotations, which are as follows: Beams, 15 inch and under, 1.35c to 1.40c; 18-inch and over, 1.45c to 1.50c; angles, 1.25c to 1.30c; plates, 1.20c to 1.30c; tees, 1.40c to 1.45c; zees, 1.35c to 1.40c. Small lots from stock are quoted at ¼c to ½c higher.

PLATES.—The demand for plates continues large, and orders for moderate lots are frequent. One contract for 1,000 tons was placed last week. Quotations are made as follows: Tank plates, 1.20c to 1.30c; flange steel, 1.30c to 1.40c; firebox steel, 1.85c to 5c.

SHEETS.—There is a good demand for both black and galvanized sheets, though the former have been doing the larger business in the past week. Included in the business placed in the week were three or four quite large orders for mill shipment. The market is firm at 2.10c to 2.15c for black and 80 and 5 per cent discount for galvanized.

MERCHANT STEEL.—The week has shown a good business, and it would have been quite a good deal larger if the mills were in position to accept all that is offered. The demand is large, and seems likely to continue so for sometime. Quotations follow: Open-hearth spring, tire and machinery steel, 1.65c to 1.75c; smooth finished machinery steel, 1.60c to 1.70c; smooth finished tire, 1.50c to 1.60c; tool-steel, 5.50c to 7.50c; specials, 11c and upwards.

SCRAP.—Considerable business was done last week, in both iron and steel rails, most of the contracts, however, being of small tonnage. In other lines the market was quiet, and gives little indication of being more active in the near future.

Dealer's selling prices are as follows:

Old iron rails, gross	$12 50 @ $12 75	Axles, net	$14 25 @ $14 75
Old steel rails, long, gr.	10 50 @ 11 00	Cast borings, net	4 25 @ 4 50
Old steel rails, short	8 75 @ 9 00	Wrought turnings, net	6 00 @ 6 50
Old wheels, gross	11 00 @ 11 50	Axle turnings, net	7 00 @ 7 25
Railroad forge, net	11 50 @ 12 00	Mixed steel, gross	7 25 @ 7 50
Dealer's forge, net	10 00 @ 10 50	Stove plates, net	5 75 @ 6 00
No. 1 mill, net	7 50 @ 8 00	Heavy melting steel, gr.	8 25 @ 8 50
Heavy cast, net	8 50 @ 9 00	Old iron splice b., net	13 75 @ 13 00
Malleable cast, net	8 00 @ 8 50		

CLEVELAND.

OFFICE OF *The Iron Trade Review and Industrial World.*
27 VINCENT ST., Oct. 19.

The iron ore market is without incident, except that the attraction of grain at 3¼c has made ore charters exceedingly scarce, though $1 is offered from the head of the lake and 85c from Marquette. There is considerable ore to come down under contract, but wild ore will be limited. The demand for old range non-Bessemer ores is such that more properties will need to be worked another year, should it keep up, as there is every prospect, particularly if exports and the new Birmingham steel plant take the expected tonnage of Southern iron from off the Northern market. But most of these idle non-Bessemer mines, and some even that were active this year, must have a better price for their product if they operate next year. The formation of the Federal Steel Co. is judged to

be rather favorable than otherwise to the inclusion of the Mesabi range in an agreement for next year. The problem of a non-Bessemer agreement, in view of this year's experience and the expected easing of Southern competition, should be simplified, also.

PIG IRON.—The establishment at Pittsburg of a single sales agency for the Bessemer product of the furnaces in the valleys has been fully arranged in the past week. The price is to be governed by market conditions, and with the $10 price at furnace withdrawn and little iron being sold, the market is difficult to quote. Some iron outside the association has been sold, netting $9.65 at valley furnace. The foundry iron market has maintained a firm tone and the position is made stronger by conditions at Southern furnaces and by the decrease of stocks in September. A larger melt of iron is noticed and as foundry iron contracts are renewed they are at higher prices than the old ones. We quote $9.50 to $9.75 valley furnace for No. 2. Gray forge is $8.75 to $8.90, furnace. Lake Superior charcoal is strong with some further reduction of stocks. We quote f. o. b. Cleveland:

Bessemer	10 40@10 55	Valley Scotch No. 1	$10 40@10 55
No. 1 Strong Foundry	10 40@10 65	Valley Scotch No. 2	10 15@10 40
No. 2 Strong Foundry	10 15@10 25	Gray Forge	9 40
No. 3 Foundry	9 65@9 90	Lake Superior Charcoal	11 50

FINISHED MATERIAL.—A Toledo ship yard contract is about to be closed, calling for 1,000 tons of plates and shapes. In spite of the inability of some plate mills to consider business for near-by deliveries, others are quoting prices indicating a different condition. Against 1.15c Pittsburg, on tank steel, quoted in some quarters, is 1.10c elsewhere, and this figure has been cut about 50c a ton in the past week. On light plates 1.15c Cleveland has been done. Some local rail business is up. In structural lines the market is quieter. Agricultural works, recently in the market, have not yet closed. On bar iron local sellers now quote 1c Cleveland, as against 1.05c recently maintained. In steel bars, Pittsburg mills quote from .95c to 1c, and particularly well filled mills have asked 1.05c. Sheets are not so firm as in recent weeks, and 2.02½c to 2.05c Cleveland for No. 28 is an ordinary quotation. Sheet mill capacity has been on the increase latterly. The small order trade in nearly every line is well maintained, and valley and Cleveland mills continue to run steadily. In the strike at local wire mills the injunction granted against the strikers to prevent interference with workers is calculated to increase the number of men at work. Production has been ample, in spite of the Indiana and Ohio strikes. We quote smooth wire at $1.22½ and wire nails at $1.42½ in single carload lots.

OLD MATERIAL.—The mills generally appear quite well filled up with stock, of late, and purchases are in small lots. Old iron rails alone show any noteworthy strength. We quote them at $13.75 to $14 delivered at mill; No. 1 wrought scrap, $10.75; old steel rails $10.25; old car wheels, $11; cast scrap, $8.25.

CINCINNATI.

Oct. 18.

There have been some inquiries during the past week which are still hanging fire, the buyers evidently doing their best to beat down prices which are quoted. In the opinion of dealers most of the cheap iron on the market has been taken up and it is predicted from now on consumers will have to pay furnace prices. The scarcity of cars in the South still continues and shipments on this account are being made slowly and irregularly. The scarcity of soft grades in Southern irons is inconveniencing many manufacturers. There is also an inadequate supply of Alabama No. 3 foundry, and the trade complains of nondelivery on old orders and the difficulty of getting new ones placed for prompt shipment. While the railroads have contracted during the year for an enlarged car equipment, it is evident that when the cotton movement sets in, pig iron and coke deliveries will be retarded. Consumption is well maintained and keeps ahead of the enormous production. Stocks at the furnaces continue to be reduced and likewise warrant stocks. We quote for cash f. o. b. Cincinnati: Southern coke No. 1 foundry, $10 to $10.25; No. 2, $9.75 to $10; No. 3, $9.25 to $9.50; No. 4 and gray forge, $8.75 to $9; mottled, $8.75 to $9; No. 1 soft, $10 to $10.25; No. 2, soft, $9.75 to $10. Hanging Rock charcoal, No. 1, $14.50 to $15.50; Jackson Co., silvery, No. 1, $12 to $12.50; standard Georgia car wheel, $14.25 to $15.

BUFFALO.

Oct. 18.

The strong condition of the market noted in this vicinity during the past four or five weeks continues. If there has been any change during the week just past it has been for the better. Quite a number of large contracts covering extended delivery have been entered at the prices asked by furnaces in this district. The demand for shipments still continues at such a pace as to keep the producers on the jump to furnish the iron. We quote for cash f. o. b cars Buffalo: No. 1 strong foundry coke iron, Lake Superior ore, $11.25; No. 2, $10.75; Ohio strong softener, No. 1, $11 25; No. 2, $10.75; Jackson County silvery, No 1, $14; Southern soft, No. 1, $11.75; No. 2, $11 50; Lake Superior charcoal, $12 to $12.50; coke malleable, $10.75.

THE record of the Cross oil filter is given in a pamphlet of attractive cover, received from the manufacturers, the Burt Mfg. Co., Akron, O. The Cross filter was first manufactured in 1890; since that time it has been introduced in 18 countries and the purchasers include the United States Government, the Spanish government and the recently superseded Hawaiian government It is one of the claims for this device that in addition to removing dirt and grit it removes acids—the mineral acids formed during the use of the oil and the free fatty acids which often exist in lubricating oil that has been used. A sectional illustration shows the construction and mode of filtration. Heavy galvanized iron forms the body of the filter and all joints are soldered, lapped and riveted. The list of users includes the names of many foundry and machine shop firms and manufacturers of iron and steel.

THE new plant of the Dresden Iron & Steel Co., located about one mile south of Dresden, Muskingum County, O., is nearly ready for operation. The main building, which is 250x80 feet, was erected by the Shiffler Bridge Co., of Pittsburg. The mill equipment was furnished by the Frank-Kneeland Machine Co., of Pittsburg, and the Lloyd Booth Co., of Youngstown. The building is traversed by an electric crane built by the Case Mfg. Co., of Columbus, O. The plans contemplate a four-mill plant, but will start with three mills, and meanwhile the fourth mill will be erected. The product will be sheets of from 12 to 31 gauge. Connection is made with the Cincinnati & Muskingum Valley Railroad, and the Cleveland, Canton & Southern. The new company starts with good prospects. Its officers are: T. J. McCullough, president; H. Ashton, vice-president; A. J. McCullough, secretary; Wm. H. McCullough, treasurer. A. J. McCullough was connected for some years with the Cambridge Iron & Steel Co., of Cambridge, O.

THE Standard Sand Co., is a reorganization of the molding sand business carried on for 16 years at Everett, Summit County, O., by H. G. Boughton. The new process sand is a recent product developed by Mr. Boughton with a view to securing to foundrymen greater immunity from the disappointments resulting from mixed grades of sand and the presence of organic matter, hindering proper vent. The new process consists in the use of heat enough to free the sand from all vegetable matter and passing the sand through rolls so as to insure entire uniformity in grade. The process is mechanical and it is thus possible to duplicate any grade desired. The saving of 15 to 25 per cent in moisture and foreign matter means a longer life of the sand, since it is only the true sand that remains and wears in the foundry. The Standard Sand Co. emphasizes the statement that a pick and a shovel are not fine enough machinery to grade and purify molding sand. The avoidance of any liability to sand holes and the production of smoother castings with a saving of facing are among the results attained with this product. The new process sand is graded from 20 to 150 mesh. It can be shipped at any time of the year, without danger of freezing. The Standard Sand Co. is also an extensive shipper of green sand, which was formerly its exclusive product. Recent shipments from the Everett works have been made to Springfield, O., Cleveland, Buffalo, Erie, Quincy, and Freeport, Ill., Chicago, Milwaukee, Syracuse, Pittsburg, and Youngstown and other foundry centers.

THE IRON TRADE REVIEW
AND
INDUSTRIAL WORLD.

DEVOTED TO MACHINERY, METAL-WORKING AND FOUNDRY TRADES AND IRON AND STEEL MANUFACTURE.

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FREIGHT MANIPULATIONS ON IRON TRAFFIC.

The anomaly of heavy traffic, with here and there indications of a car scarcity, accompanied by demoralization of freight rates to an extent almost unparalleled, might prompt comment, were it not that railroad policies are not amenable to ordinary economic laws. In the iron trade a disturbing factor of large proportions, in this year of unequaled production and of some advance to higher ground, has been the uncertainty about freight rates. The mysteries of delivered prices have been puzzled over by many a seller, but rarely with any satisfaction, particularly if a price in question happened to land his competitor's product at a figure totally discrediting his own well-conned cost sheet. By way of compensation, the unsuccessful bidder in turn gets an unheard-of concession in another direction; and the method once well learned, that which was the extraordinary becomes at length the ordinary, and open cuts and retalitations put schedules beyond all law save that of "any rate to get the business." Manufacturers are taught by this regularity of special rates to expect freights which cannot be maintained regularly without a very unsalutary effect upon earnings statements.

Western roads have been enjoying exceptional prosperity, from all accounts, in the past 18 months; the chief embarrassment with many of them of late has been to furnish cars enough to move the freight offered. The Northwest has emphasized this condition even more than Chicago. Yet according to this statement of the *Railroad Gazette*, both freight and passenger departments are being conducted on the policy of making rates regardless of agreements:

> The continued activity of Western traffic men, as indicated by the constant reports of their conferences and "agreements," suggests that the associations out that way, like the Irishman's turtle, are dead, but are not conscious of the fact. The conferences continue, but the practice, all around, of making whatever rates one sees fit to make, also continues. It is now reported that all the roads in the Southwestern Passenger Association have flatly refused to pay the fines assessed for violating the agreement in the matter of transportation of troops. The Western Trunk Line committee also, according to reports, is having trouble because the members are disregarding the percentages allotted to them, and there is no way to compel any member or members to contribute to the support of their less fortunate brethren.

In the iron trade, cut rates have been notorious in the past few months. The freight department of some of the large producers of iron and steel in the Central West has come, indeed, to be one of the most important of all, quite ranking the mechanical and operating departments. It is not so much a question, in going after a desirable order, how much below a competitor's cost the material can be turned out, as what manipulation of freight rates can be secured that will permit of the lowest delivered price. These low delivered quotations might be supposed to be especially agreeable to the buyer; but the trouble there is that he is left to guess how much better a concession his competitor has secured, who has bought from another manufacturer, or mayhap from the same one. And where prices are quoted, with delivery at the nearest distributing point to the consumer, the fact that the seller holds on to the material to the farthest point and determines its route, does not tend to satisfy the buyer that he might have done better on competitive quotations at mill.

In the Central West the effect of recent freight cuts and counter cuts has been to wipe out to a great extent the differentials that have been so long and so studiously maintained on east and west shipments as between Cleveland, the valleys, Wheeling and Pittsburg. The tendency has been to line up all these districts, as though they were on the same meridian and enjoyed practically the same advantages in water shipments.

Enough has been said on the general subject of freight concessions to bring some reform, if discussion and conferences could accomplish that desirable end. If a time of unparalleled activity in the iron trade does not assist in solving the problem, but rather complicates it, the evil would seem to be well-nigh incorrigible. Natural advantages, as they appear in the well calculated comparisons of various districts as economical assembling points for iron manufacture, for example, have no significance in this regime in which the traffic manager becomes the great leveler.

"VIOLENCE" AS A STRIKE WEAPON.

Judge Hammond of the United States Circuit Court, sitting in Cleveland, allowed on Tuesday of this week, the injunction asked for by the American Steel & Wire Co. against the strikers who have been patroling the neighborhood of its works for several weeks. The court says in its decison that the Debs case, as passed upon by the Supreme Court of the United States, settles every suggested defense of the Cleveland wire mill strikers, and that the writ of injunction approved in that case could be adopted almost verbatim in the present one. The portion of the decision which covers the question especially at issue in the proceedings, and a question raised in connection with nearly every strike, is as follows:

> The whole fallacy of the defense against this bill and the

proof offered to sustain it lies in a convenient misapprehension or a necessary misunderstanding of the character of that force and violence which all agree is not permitted in the conduct of a strike. It seems to be the idea of the defendants that it consists entirely of physical battery and assault, and that if any of these appear in the proof, and they can be justified as they might be on a criminal indictment or in a police court, that ends the objection, and the justified assaults and batteries will not support an injunction.

The truth is that the most potential force or violence may exist without lifting a finger against any man or uttering a word of threat against him. The very plan of campaign adopted here was a most substantial exhibition of force, by keeping always near the mills large bodies of men massed and controlled by the leaders, so as to be used for obstruction if required. A skillful wire-worker, but a timid man, would be deterred by the mere knowledge of the fact from going to the mill when he desired to go, and had agreed to go, or was already at work, and feared to return to it through the streets where the men were congregated, or, having started, would turn back when fearing the trouble that might come of the attempt. Such a force would be violence and within the prohibition of the law, and its exhibition should be enjoined as violating the property rights of the plaintiffs in the streets, their liberty of contracting for substituted labor, and the liberty of the substitutes to go to work if they wished to accept the lowered wages and to pass through the streets to their work.

Elsewhere in the decision Judge Hammond makes very emphatic the point that liberty to work as one pleases and liberty to contract for labor as one chooses, is protected by law. It is this right, he argues, which lies at the foundation of the strikers' own freedom, when they could work and refuse to work on any terms but their own. "In this country this freedom to contract in business is a constitutional freedom, which not even State Legislatures can impair, and certainly not strike organizations." Yet the Governor of Illinois has assumed to do what no Legislature can do in saying that Negro miners from another State shall not offer their labor for sale in Illinois.

Judge Hammond well answers the claims that the strikers gathered at the American Steel & Wire Co.'s mills were there only to use entreaty and argument upon men going to the plant to obtain work. "One authenticated instance in this proof," says the court, "where the strikers, after meeting a single 'scab' or group of them, or an organized body of them, had stood aside, or opened up the street, and allowed him or them to pass to the mill without more ado, after the entreaty or argument had failed to convince, would be worth more as a matter of evidence, showing the good faith of the strikers in their assertion that they were on the street only for an opportunity of entreaty and argument, than all the affidavits filed in this case."

Loose talk about "public policy," as a reason for non-interference by courts in such contests, and claims on behalf of strikers, as at Homestead, of the right to "protect" the works against the coming of other workers, cannot stand against the clear statement of the situation given in Judge Hammond's decision. The intimidation of would-be workers, a manifestly unlawful purpose, is the object of the massing of bodies of strikers about the works they have left; and it is simply saying that courts and police authorities must wink at such unlawful procedures because they are planned and carried out by labor organizations, to ask that no judicial notice be taken of them until actual rioting and bloodshed have resulted.

Personal.

—Andrew Carnegie has accepted the invitation of the Chamber of Commerce of Pittsburg to be the guest of honor at its annual banquet and reception to be held within the next few weeks, on Mr. Carnegie's arrival at Pittsburg. A London contemporary has this announcement, the latter portion of which, in view of the recent publications concerning a new shipyard at New York is "important if true:" "Mr. Andrew Carnegie is about to spend some months in the United States. He is occupying himself with the arrangements needed for the new ship building yard." As already stated in these columns, plans have been made for a new ship building enterprise at New York, and a well known Western ship yard manager has been tendered a like position with the new company. Mr. Carnegie's connection with it, however, has not been established.

—Timothy McHugh, one of the oldest foundrymen in Chicago, died at the Chicago Hospital, Oct. 16, from the effects of an operation. He was born in Lincolnshire, Eng., and came to the United States when young. He learned the molder's trade at Cincinnati. He was well known in the iron business, and was the proprietor of a foundry on West Monroe st.

Arthur Keen, of Birmingham, Eng., who visited the United States last summer, has just returned to England after his second trip to this country, which was made in connection with some details of the Federal Steel Co.'s various transactions.

Lake Superior Iron Mines.

A decision was rendered at Duluth, Oct. 10, by Judge Stanton, of the United States Court of Appeals, in the case of the Germania Iron Co., appellant, vs. H. E. James and Chas. W. Hillard. It is in favor of the appellant and is of vast importance. The Germania Iron Co. means A. M. Miller, of Duluth, and it has fought the opposition, in which the Minnesota Iron Co. interest is prominent, for nine years. The land is situated near Ely and is described as the northwest quarter of the southeast quarter of 30-63-11. This portion of the property is said to be one of the most valuable of that which was in litigation. The whole question was as to whether a decision of the secretary of the interior cancelling an entry left the land involved open immediately when the secretary made it or whether the land was not open to entry until the decision was received at the local office. The secretary of the interior and Judge Lochren held to the former opinion, but the court of appeals upholds the latter contention.

The well known Miller-Brown mining property described as "Section 26" will hereafter be known as the Savoy mine. That name has been given the property by the Oliver Mining Co. The extension of the Iron Range Road to the mine has progressed to the extent that it is ready for the steel. Coal trestles are put in for the Savoy and the Zenith.

The recent acquisition of mining properties at Iron River, Mich., by the Oliver Iron Mining Co., has directed attention anew to that portion of the Menominee range. Other ore consumers have been looking up the district, also. The mines taken by the Oliver interest are the Iron River, Isabella and Miller. They are located across the river from Iron River, in Stambaugh township.

With the removal of stockpiles at so many Lake Superior properties, in the past season, it is evident that the mining force will have to be increased, particularly on the older ranges, if production for 1899 is to be up to the scale of shipments for 1898.

New Blast Furnaces at South Chicago.

Two new blast furnaces and an extensive ore shipping dock, additions which will increase the working force nearly 1,000 men, are to be built by the Illinois Steel Co., at its South Chicago plant. A largely increased business and the great demand which has come with the return of prosperous conditions makes the present dock and furnace equipment inadequate. Work on the new additions began yesterday. They will be located immediately east of the furnaces lately constructed on land reclaimed from the lake by filling in with slag.—[Chicago Times-Herald, Oct. 14.

Iron and Steel Sheets for Roofing.

Periodically statements appear either in trade circulars or in the columns of trade papers, testifying to a recent change in the relative demand for steel and iron, in some form of material. The contest over iron and steel pipe and iron and steel sheets has been whipped over time and again in the past dozen years; generally with the outcoming conclusion that there are good and bad iron and good and bad steel. It is with no thought of renewing it that we have recently sent out inquiries on the subject; but rather for the purpose of finding corroboration or the contrary of a statement recently made in a communication to this office from a subscriber who has opportunity to know something of trade tendencies in this regard. The statement was that iron sheets for roofing have been more largely in demand of late and the inference was drawn that the movement was in a measure a reaction from steel. Testimony on this point was sought from a number of roofing firms and from sheet manufacturers having the roofing companies as their customers. The replies are interesting, but as little conclusive as previous testimony on the same matter. Indeed, generalization could hardly be expected when it is known that trade practice follows no sharply defined lines; orders for iron being often filled with steel, where it is judged by the seller that the customer uses the term "iron" in its generic and not in its technical sense, or even without regard to this or any other point, except that only steel is handled by the seller. Popularly the distinction drawn is between material that can be traced to the puddling furnace, on the one hand, and that which can be followed back to the Bessemer converter or to the open-hearth furnace. The fact that almost identical analyses may be shown in a sheet from puddled iron and another sheet from Bessemer steel is not considered; nor is the difficulty of accurately defining steel, with which writers on the metallurgy of steel have contended. It will be noted, however, that the responses below presuppose a well-defined distinction between the two metals. No attempt is made to give reasons for differing wearing qualities, growing out of chemical constituency or mode of manufacture, as that was not included in the question. Testimony as to trade facts was sought. It will be seen that the point of view has much to do with the facts that come under the observation of a manufacturer. Firms known to make a specialty of iron roofing naturally get more inquiries for iron than those known to handle steel almost exclusively:

A Broad Generalization.

Our experience is that steel for roofing is a failure. Iron is demanded by our customers but we can't get it. We must get back to iron or the business is ruined.

HOLTON IRON AND STEEL ROOFING CO.

Lisbon, O.

Good Steel Will Give Better Service.

Our judgment is that there are more serviceable roofs in use to-day, made of good soft steel, than there ever were, in proportion, of strictly iron sheets. We have roofs in our vicinity made of steel sheets, which have been on for 10 years and are still doing good service. We have been in this business for 22 years, for 12 of them using iron sheets and for 10 years using steel sheets. A good soft steel sheet, is nothing more than a highly refined iron, and why it should not last as long as iron, we have never been able to see. Of course a great deal of poor iron was used in the olden days, and a great many poor steel sheets are used to-day. If to-day the same care were exerisced in selecting a good steel sheet which was exercised in selecting good iron sheets in the earlier and formative period of the so-called iron roofing business, there would be none of the difficulty in the use of steel sheets, claimed by some makers At the same time, the quality of paint has somewhat deteriorated with some makers, and without a good paint neither iron nor steel will make a lasting roof. The almost unbearable demand for "cheap" and still cheaper roofing, is largely responsible for poor steel roofing. Our experience of 22 years leads us to believe that where proper care has been taken in the selection of materials and paint, steel roofing will give better service all around than any iron used by manufacturers.

HYNDMAN STEEL ROOFING CO.

Cincinnati.

Forty Per Cent of Demand is for Iron.

During the past few years the demand for iron sheets for roofing has increased very largely, and where the demand two or three years since was nearly, if not all, for steel sheets, we presume that 40 per cent of our inquiries to-day call for iron, and the demand of late has been such that we have been compelled to carry a stock of iron sheets on hand in order to give prompt shipment to that part of our trade calling for iron. This demand seems to be increasing even though the price for iron sheets is very nearly $5 per ton higher than the price for steel. We would not care to enter into a discussion at the present time as to which is the better for roofing, but will say that a very large number of the largest users of roofing are calling for iron and are perfectly willing to pay the advanced price demanded for iron sheets.

CINCINNATI CORRUGATING CO.

Piqua, O.

Trade Demands the Cheaper Product.

While we notice some few concerns advertising charcoal iron roofing, also charcoal iron roofing plates, we have so far had no demand. We are inclined to think there will be a demand later on because of its lasting qualities. The only drawback to its use at present is the fact that it is more expensive. Trade now demands cheap goods.

ILLINOIS ROOFING & SUPPLY CO.

Chicago.

Steel Sheets Bend Better.

We are at the present time using all-steel sheets for our roofing material. We have been very fortunate for the past two years in getting a very satisfactory material, but we are satisfied that some of the steel sheets that are manufactured are very poor. If iron sheets could be manufactured so that they would double seam without breaking, we think there would be much more iron used for roofing, but most steel roofs are so constructed that they have to stand quite a sharp bend in making the seams, which accounts for a great many of the manufacturers using a steel sheet; but as to durability the iron sheets would be the best. The greatest trouble is that many of the manufacturers are using too light a sheet steel for roofing purposes. There should not a sheet be used lighter than No. 26 gauge. If this were practiced by all manufacturers in iron and steel roofing they would give a great deal better satisfaction..

LA CROSSE STEEL ROOFING & CORRUGATING CO.

La Crosse, Wis.

Old Style Charcoal Iron Roofing.

The enclosed circular will give you a substantial reason for our going back to the old-style charcoal iron roofing. While there is comparatively little demand for it at the present time, yet we fully believe before any great length of time iron will take the preference over steel, even at the difference in price.

THE CANTON STEEL ROOFING CO.

Canton, O.

[The circular states the matter thus: "Our experience with steel for roofing has convinced us of the fact that it is of little value compared with the old-style charcoal iron. A practical demonstration has proven that the iron roofs we furnished 20 years ago are as good to-day as when first put on. We know of steel roofs that have lasted only a few years. On account of steel being much cheaper than charcoal iron, a large demand has been created and for this reason we were compelled to use it. In view of the above, we believe it economy to go back to the old-style charcoal iron roofing. This material is worked in a knobbling furnace, with charcoal as fuel, and is made in the old-fashioned way, same as 10 years ago. It is not made with top and bottom of charcoal and middle of steel, but is solid charcoal iron throughout, made by the old process. The old-style charcoal iron roofing will cost more than the common steel, but we consider it worth more than the difference in price."]

No Tendency Toward Iron.

Our experience has been contrary to that suggested in your letter. Our customers almost without exception demand steel. This is not only true of the present but has been true for some time back, and we do not therefore note the change or reaction spoken of.

GEDGE BROS. IRON ROOFING CO.

Anderson, Ind.

Demand Will be Made by Manufacturers.

An Ohio roofing company writes: We have not as yet experienced any special demand for iron roofing instead of steel, although we occasionally have an inquiry for it. Some of our competitors are advertising the old-style stock, and we presume if they continue to do so it will create some inquiry for it.

Few Inquiries for Iron.

We rarely have inquiries for iron roofing. All of our sheets are now made of steel.

REPUBLIC IRON WORKS.

Pittsburg.

Life of Steel Roofs is Longer.

In regard to the call we are having for iron roofing, beg to say that we rarely have iron specified. We have yet to find a single case of a customer who is not satisfied with the steel sheets in the corrugated form. While it is possibly true that a perfectly made iron sheet might stand the corrosive effects of exposure better than some grades of steel, yet it is a fact that iron as ordinarily made and supplied heretofore was usually so full of holes and so defective that in our opinion the average life of the iron roof did not begin to compare with the life of the present steel roof. Steel being a more perfect metal, produces a sheet freer from pin holes, and consequently when well painted will stand the wear of time better than the old style roof. The theory of the iron roof is all right as a theory, and there are a few cranks who hang on to the idea that iron is the only thing, but in our business, fortunately for us, we seldom run across such people. There may be a few of them found among the country tinners in the back woods towns, where they have not kept up with the procession of modern ideas and thought.

AETNA-STANDARD IRON & STEEL CO.

Bridgeport, O.

SEMET-SOLVAY PLANT AT ENSLEY.

The following description of the new by-product retort coke-oven plant at the Ensley, Ala., furnaces of the Tennessee Coal, Iron & Railroad Co., is taken from a paper read this week at the Buffalo meeting of the American Institute of Mining Engineers by Wm H. Blauvelt, of Syracuse, N. Y.:

The plant of the Semet-Solvay ovens at Ensley consists of 120 ovens, arranged in two parallel blocks of 60 each. The coal used is the washed slack from the Pratt seam, and it is expected that the plant when in full run will produce from 420 to 460 tons of coke per day. This coke will be consumed by the Ensley furnaces. In the design of the plant careful attention has been given to the problem of handling materials with a minimum of labor, and at the same time elaborate handling machinery has been avoided as being unsuited to the class of labor most available. A spur from the track leading from the Pratt coal mines and washers is carried directly over the coal bins above the ovens, the track having a grade at the steepest par. of 1.05 feet per hundred, so that a locomotive can deliver a day's supply of coal at one shift.

The coal is delivered in 30-ton cars with sloping hopper bottoms, and one laborer can easily dump in 10 hours the whole day's supply. The bins have a capacity of 1,500 tons of coal, to provide against any irregularity in the supply. The coal for charging the ovens is drawn into larries below the bins and charged into the ovens as above described. When coked, the charge is pushed from the oven by a steam ram, and quenched as it falls onto a car provided for the purpose. This car is 30 feet long and seven feet wide, with a sloping bottom, and is so arranged that, when pushed out on it, the coke lies in a thin, even layer that permits complete quenching with a minimum resultant moisture in the coke.

The blocks of ovens are located at right angles to the line of the Ensley furnaces and about 350 feet distant from the stock-house. This arrangement permits the most convenient delivery of the coke to the stock-house. By a wire rope and winding-engine the quenching-cars are drawn up a grade of one to six into the stock-house to an elevation sufficient to permit the coke to be dumped into a large bin with a sloping bottom, which in turn discharges directly into the furnace buggies that are sent to the tunnel-head. Thus the coke is moved but three times after it is quenched until it lies in the furnace, and the breakage is reduced to a minimum. A coke fork becomes a useless utensil, with a corresponding reduction of labor.

Turning now to the by-products from the coking plant, the by-product building is located midway between the two blocks of ovens and is of slow-burning mill-construction. Two sets of gas condensers, one for each 30 ovens, are at each end of the building, and beyond them at one end is the sulphate of ammonia house. Within the building are the necessary exhausters, washers, pumps, tanks, etc., for collecting the by-products. Immediately adjoining the property on the west is a tar-distilling plant, and the tar collected from the gas, after being measured, is pumped directly from the by-product building to its receiving tanks. This plant produces from the tar, roofing-pitch, tar-paper and creosoting oils, for all of which products there is a market in the South. The ammonia produced is at present manufactured into sulphate of ammonia. As the ammonia is condensed out of the gas it is collected in the form of a weak liquor containing probably not more than one per cent of NH_3, along with a good many impurities. To make the sulphate this liquor is distilled with steam and the resulting ammonia gas is absorbed in a bath of sulphuric acid contained in a lead-lined tank. The crystals of sulphate fall to the bottom, whence they are raked out, drained and bagged for shipment.

The sulphate of ammonia finds a ready market, as there are large fertilizer factories in a number of the Southern States, and sulphate is one of the most valuable sources of nitrogen obtainable. It is worth more per unit of nitrogen than nitrate, blood, or any of the other usual sources of this important element. Anhydrous ammonia, that is, ammonia gas condensed by compression into the liquid form, is used in large quantities throughout the South in the manufacture of artificial ice. This form of ammonia is not produced in the Ensley plant as yet, but it may be arranged for later.

The surplus gas from the plant, of which there will be some 2,000,000 cubic feet or more per day, is to be used in the new basic open-hearth-steel mill that is being erected within a short distance of the oven plant. This gas will doubtless prove to be of more value as an auxiliary than as a direct substitute for producer gas in the open hearth furnaces. It will be a great convenience for drying ladles, heating soaking-pits, or in other places where comparatively small quantities of gas are required, and of a better quality than ordinary producer-gas. It has been suggested that the open-hearth furnaces be piped for the coke oven gas, in order to provide an easy means for rapidly controlling the heats, if occasion should arise.

While the oven plant is not yet in full run, yet enough work has been done to make a reliable comparison between the production of coke from this plant and from the bee-hive ovens of the Birmingham district. It is the practice of some of these plants to coke two 48-hour charges and one 72-hour charge per oven per week. At other places it is more common to run one 72 and one 96-hour charge per week. A comparison of the output of the by-product ovens and the bee-hive shows that the 120 ovens in the by-product will equal in production about 300 bee-hives making 48 and 72-hour coke, and about 340 bee-hives running on 72 and 96-hour charges. The charges of coal are heavier when the bee-hives make only two charges per week.

This difference in the output per oven of the bee-hive and retort-oven plants is due to the more rapid coking in the retort-oven, although the individual charges are smaller, and also to the increased yield in coke per ton of coal due to the improved method of coking. Careful tests have shown that this increased yield adds from one-sixth to one-fifth to the amount of coke produced from a ton of Pratt coal. A careful estimate of the labor on a bee-hive plant of 300 ovens compared with that on the plant of 120 by-product ovens as operated at Ensley, shows that the bee-hive plant requires 1,020 hours labor per day, and the by-product plant 732 hours. In the former figure are included only the men required to charge, level, water and draw the ovens and to load the coke onto cars. In the latter are included all men required about the plant, except the foreman, including those on the ovens and in the by-product plant, delivering the coke into the furnace stock-house, loading the sulphate of ammonia into cars and delivering the tar to the purchaser. The delivery of the coke is a question of location. If the ovens were not at the furnace plant the coke would be delivered into railroad cars.

FEDERAL STEEL CO. ORGANIZED.

At the meeting of the Federal Steel Co., held in New York, Oct. 11, E. H. Gary, counsel of the Illinois Steel Co., was elected president of the new company. The directors chosen were as follows: J. Pierpont Morgan, New York; H. H. Porter, Chicago; Marshall Field, Chicago; Norman B. Ream, Chicago; E. H. Gary, Chicago; Robert Bacon, of the Morgan banking house, New York; D. O. Mills, New York; Samuel Mather, Cleveland; Roswell P. Flower, ex-Governor of New York; C. C. Cuyler, New York, and Nathaniel Thayer, Boston. The three young men who filed the articles of incorporation in New Jersey are retained as nominal directors to complete the full board. R. Trimble, of New York, was made secretary and treasurer. Practically all the stocks of the Minnesota Iron, the Illinois Steel and the Elgin, Joliet & Eastern Railway companies are said to have been deposited with the Colonial Trust Co. under the plan of consolidation. Two or three large holders who are in Europe have signified their intention to deposit their securities. These are about the only ones of any consequence who have failed to make an actual deposit. The exchange of stocks and securities of the Federal Steel Co. will be effected as soon as possible and it is expected that the Federal share certificates will be ready for delivery some time next month.

The New President.

Elbert H. Gary is one of the leading corporation lawyers at the Chicago bar. He has been for some years general counsel of the Illinois Steel Co., Northwestern Elevated Railway Co., the Baltimore & Ohio Railroad Co., for the Western department, and for the Consolidated Steel & Wire Co., and the Columbia Wire Co. He was active in the organization of the American Steel & Wire Co., and has been its general counsel. He was born Oct. 8, 1846, in DuPage County, Ill., and was raised on a farm. He attended the district schools during the winter months and worked on the farm in summer. After several terms in Wheaton College, at 18 years of age he began reading law at Naperville, and two years later entered the law department of the Chicago University, graduating in 1871. He was admitted to practice before the Supreme Court of Illinois the same year, and in 1875 was admitted to practice before the United States Supreme Court. In 1871 he located permanently for the practice of his profession in Chicago, making his home at Wheaton. From a general law practice, he has gradually drifted almost wholly into the law of corporations. His brother, the late Noah E. Gary, was in partnership with him for 16 years. Since 1890 Judge Gary has had an office alone. In 1884 he was elected judge of DuPage County and served two terms. Judge Gary is a member of the Union League, Chicago Athletic, Chicago Golf and Cross Country Clubs. He is a Methodist and a Republican. He is described as of genial manner and firm in friendship, having the highest confidence of his associates.

Judge Gary arrived in Chicago from New York early in the present week. He stays in Chicago for a few days only, returning to New York, where he will make his permanent headquarters.

Lorain Steel Co. Deal Closed.

President Gary and H. H. Porter, chairman of the board of directors, started from New York to inspect the plants of the Federal Steel Co. Johnstown, Pa., was first visited, and on Saturday, Oct. 15, they arrived at Lorain, O., where the papers were signed completing the transfer to the new company of two-thirds of the stock of the Lorain Steel Co. As has been stated heretofore, the stockholders of the Lorain Steel Co. retain a one-third interest. This acquisition involved an outlay of something less than $6,000,000 of the $14,000,000 cash with which the new company started out. It is understood that the options taken on the property of the Sheffield Land & Improvement Co. and the Lorain Street Railway Co., taken by the promoters of the Federal Steel Co., have not yet expired, and that the question of their transfer has been left for after consideration.

As was intimated in a previous article on this subject, the plans for the enlargements now under way at Lorain will not only be carried out, but eventually enlarged upon, as the advantages of Lorain as a steel-making site are thoroughly appreciated by the promoters of the consolidation.

President Gary has made the statement that no change will take place in the management of the constituent companies for the present. Their corporate entities will be maintained, their stock being owned and voted by the Federal Steel Co. The Federal Steel stocks were placed in the unlisted departments of the New York Stock Exchange Monday, Oct. 17, and there was moderate trading in them. The common opened at 31, improved to 31½, and then went off to 29. The first sales of preferred were at 70, from which there was an advance to 71 and a reaction to the opening figure. The promoters of the new company predict very active trading in its stocks in the next six months.

CONDITION OF BLAST FURNACES OF U. S.*

Oct. 1, 1898.

Location of Furnaces.	Coke and Anthracite.					Charcoal.				
	Total No. of Stacks.	In Blast.		Out of Blast.		Total No. of Stacks.	In Blast.		Out of Blast.	
		Number.	Weekly capacity.	Number.	Weekly capacity.		Number.	Weekly capacity.	Number.	Weekly capacity.
New York	11	3	4361	8	6164	5	0	0	5	578
New Jersey	2	1	541	1	942					
Spiegel	3	3	469	0	0					
Pennsylvania:						13	1	140	12	600
Lehigh Valley	32	6	4298	26	10630					
Spiegel	1	0	0	1	90					
Schuylkill Valley	11	6	4310	5	3647					
Upper Susqu. Val.	4	2	951	2	1200					
Lower Susqu. Val.	9	3	4113	6	2221					
Spiegel	1	0	0	1	375					
Lebanon Valley	11	8	6164	3	2355					
Spiegel	1	1	505	0	0					
Pittsburgh	29	26	5344[8]	3	5761					
Spiegel	1	1	1267	0	0					
Shenango Valley	16	9	14029	7	7172					
Western Pennsylvania	19	9	11106	10	5294					
Spiegel	1	1	704	0	0					
Maryland	5	0	0	5	5770	4	1	122	3	424
Wheeling District	9	8	9893	1	1388					
Ohio:						9	3	231	6	463
Mahoning Valley	13	9	14265	4	5225					
Central & Northern	9	9	12826	0	0					
Hocking Valley	2	0	0	2	850					
Hanging Rock	12	7	2603	5	1149					
Indiana	1	0	0	1	130					
Illinois	16	13	24114	3	3765					
Spiegel	1	1	954	0	0					
Minnesota	1	0	0	1	629					
Wisconsin	4	3	2758	1	650					
Missouri	2	1	1050	1	650	1	0	0	1	316
Colorado	3	2	2200	1	1000					
Virginia	22	10	7059	12	7335	4	0	0	4	417
Kentucky	6	5	2375	1	600	3	0	0	3	200
Alabama	30	19	18631	11	8360	12	2	675	10	2259
Mich. and Wisconsin						17	7	3535	10	3470
Tennessee	13	6	4809	7	3950	9	2	350	7	2310
Georgia	2	0	0	2	960	3	1	325	2	360
North Carolina	2	0	0	2	600					
New England						13	2	250	9	858
Texas						4	1	104	3	700
Utah						1	0	0	1	175
Oregon						1	0	0	1	275
Totals	305	172	209903	133	89062	97	20	5732	77	13426

SUMMARY.

Fuel.	In Blast.						Out of Blast.			
	Number.			Weekly Capacity.			Number.		Weekly Capacity.	
		Month Previous.	Year Previous.		Month Previous.	Year Previous.		Month Previous.		Month Previous.
Charcoal	20	21	20	5,732	6,293	4,636	77	76	13,426	13,839
Coke and Anthracite	172	165	151	209,903	206,750	195,492	133	139	89,062	94,008
Total	192	186	171	215,635	213,043	200,128	210	215	102,488	107,847

*Condensed from the *Iron Age*.

T. A. Frazer, superintendent of the Wells & French Car Co., of Chicago, killed himself last week Wednesday at his home. Mr. Frazer had been ill for a considerable time, and it is thought despaired of ever regaining his health. He was 50 years old, and had been connected with the Wells & French company for seven years.

HOMESTEAD ARMOR PLATE DEPARTMENT.

A handsome flat quarto volume of 80 pages, bound in cloth and leather, has been issued recently by the Carnegie Steel Co., Ltd., giving details of ballistic tests of Carnegie armor plate in the past five years. A view of each plate is given as it appeared after the firing of the rounds called for by its test. There are half-tone illustrations, also, of various turrets and portions of side armor furnished for the battle ships and cruisers of the United States Navy. In addition to these the volume has reproductions of photographs of the well known fighting ships of our navy and of the great works of the Carnegie Steel Co., from which so important a contribution has been made to our naval armament. The dedication of the work is "to the Admiralties interested in such matters," and it is certain that the volume will carry to all parts of the world an impressive idea of the marvelous resources of the plant at Homestead and of the incomparable fitness of its products for the service for which they are designed.

In the enumeration of the Carnegie Steel Co.'s various plants, their capacities and products, the following data are given relative to the Homestead Steel Works: "At Munhall, one mile from Pittsburg on the Pennsylvania, the Pittsburg & Lake Erie, and the Union Railroads, and the Monongahela River. Two 10 gross ton Bessemer converters; 30 open-hearth furnaces. Product: Blooms, billets, structural shapes, bridge steel and armor plate, ship and tank plate and steel castings. Annual capacity, 400,000 gross tons of Bessemer steel ingots and 900,000 tons of open-hearth steel ingots. Finishing capacity of armor plate department, 6,000 gross tons per annum."

The illustrations of the armor plate department of the Homestead plant give some idea of the mammoth scale of its equipment—the great pits in which 90-ton ingots are cast; the crane service which permits of handling these prodigious masses of steel; the method of manipulation in reheating; the 12,000-ton Whitworth forging press; the mill on which lighter armor plate is rolled; the 3,000-ton bending press; the machine and bending shops and the heavy tools required for the machinery of face hardened armor. Four of these views, which are representative, are given in the accompanying illustrations.

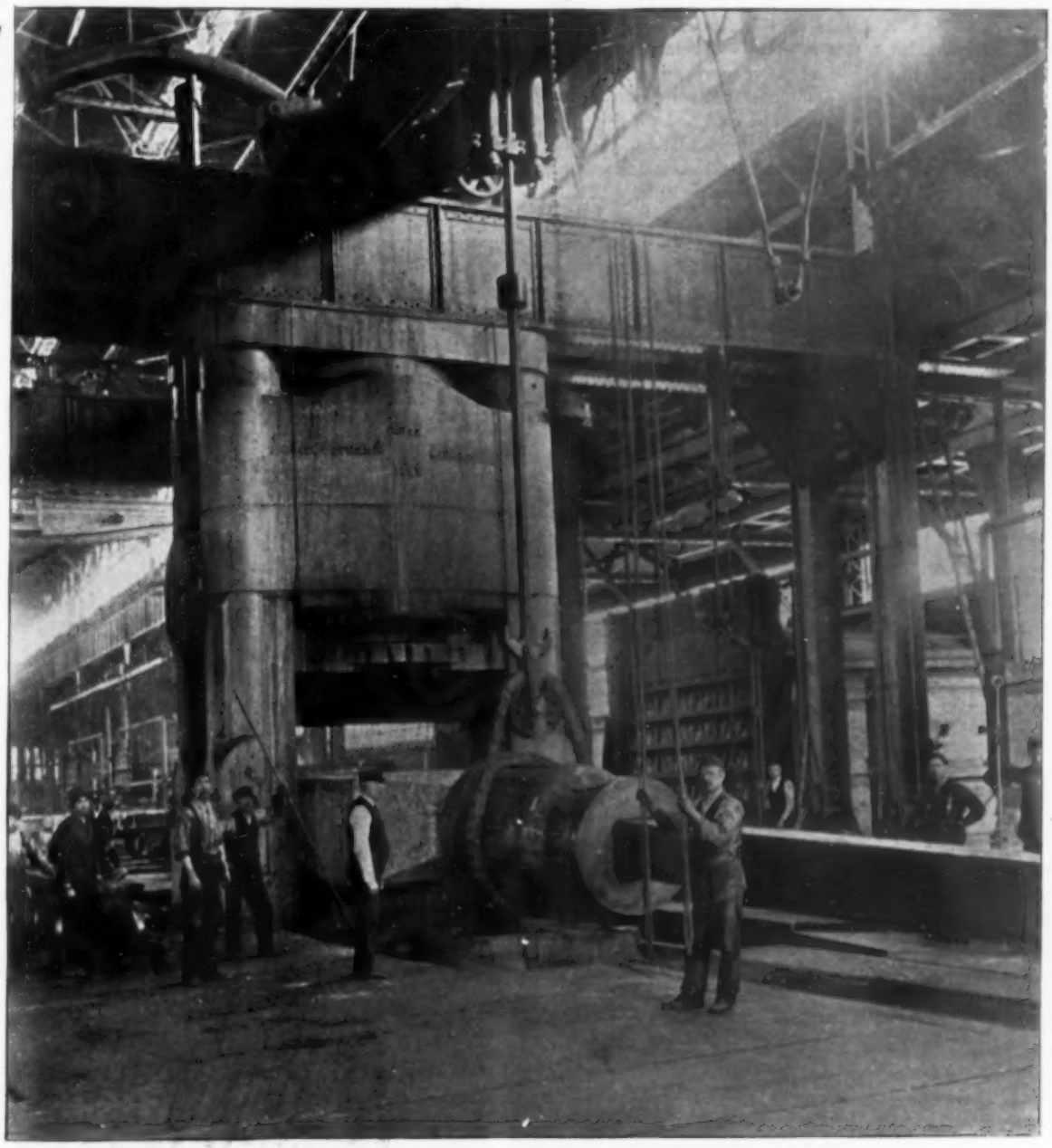


FIG. 1.—HOMESTEAD STEEL WORKS, ARMOR PLATE DEPARTMENT—FORGING A 90-TON INGOT UNDER THE 12,000-TON PRESS.

THE Charles Munson Belting Co., 36 South Canal st., Chicago, made an assingment Oct. 16 to the Chicago Title & Trust Co. The failure is said to have resulted from trade depression.

IT is reported in Pittsburg that local and foreign capital is canvassing a project for the establishment of a plant to manufacture oxidized steel, the effect secured being similar to that of the Bower-Barff process.

THE Mapleton, Ia., foundry will start up under the management of L. Holbrook.

ANTHRACITE COAL IN PERU.

William Griffith, mining engineer, of Scranton, Pa., read a paper before the Mining and Metallurgical Section of the Franklin Institute of Philadelphia, on Oct. 12, on "Anthracite Coal in Peru, South America." There are two principal coal fields about 100 miles apart which Mr. Griffith visited in northern Peru. The first, located in the Department of Cajamarca, consists of two large coal basins, each probably 20 or 30 miles long, extending side by side, northwest and southeast, separated by a prominent anticlinal. The northern of these two basins dips into the mountains and occupies the region near the junction of the Llaucon and Marinon rivers, which flow into the Amazon river. The other basin occupies the mountains of the continental divide of the Andes, between the towns of Hualgayoc and Chota, and is overlaid by an immense thickness of limestone of a very recent age. The western outcrops are on the Pacific slope, where future explorations may discover the coal. The coal beds of this field are found in a great thickness of Jurassic sandstone, the bottom part only of which was examined, and contains several beds of anthracite coal from three to seven feet thick. These seams dip about 25 degrees and have a strike northwest and southeast. Their quality, both as to the inter-stratified refuse and chemical analysis, is equal to the average of Pennsylvania anthracite; and if the beds are as continuous as is usual with coal seams, there exists here an enormous body of coal which can be mined by drift or tunnel, above water level, for years to come, as the outcropping coal measures are visible flanking the sides of the valleys of the streams, for long distances. The field would be practically inexhaustible. It is about 300 miles from the navigable waters of the Amazon and 150 miles from the Pacific.

The other field is located on the Chicama River, in the Department of Libertad, about 30 miles southwestward of the town of Huamachuco. The coal here occurs in the same sort of sandstone, but at a dip of about 70 or 80 degrees. The principal bed is a large one, 10 to 20 feet in thickness, the outcrop of which is opened at various points, and may be readily traced for miles. The bed is on the Pacific slope, 100 miles from the ocean. The coal beds are remarkably free from impurities, and the quality of the coal is proved by analysis to excel that of Pennsylvania. Smaller seams are also visible above and below the mammoth bed of the region The outcrops of the coal-bearing rocks in this field may be readily traced for 15 to 30 miles, with few interruptions. The quantity of coal which could be mined is very large and much of it may be secured above water level.

The mountainous country in the region of these coal fields is elevated 7,000 to 13,000 feet, and is wild and sparsely inhabited, but is susceptible in places to extreme cultivation along certain lines, and remarkable development would undoubtedly follow the introduction of modern means of communication and transportation.

Review of the Technical Press.

BY DR. RICHARD MOLDENKE.

Specifications for Foundry Castings.—In connection with the discussion on specifications for pig iron in *The Iron Trade Review* last year, we gave, among those of other firms, the specifications on which the J. I. Case Threshing Machine Co., of Racine, Wis., buy pig iron. The company has recently printed, also, its specifications for foundry castings. First comes the iron, of a hard, close-grained character, to be put into work for high pressures. 1.20 to 1.60 silicon is required, and sulphur not to exceed .095. For everything except very thin castings phosphorus should be below 0.70, and unless chilled castings are required, manganese below .70 also. These are safe figures for this class of work. The second class of irons contains those of medium hardness, such as for engine cylinders and gears. The silicon here runs up between 1.40 and 2 per cent. Sulphur is preferred at .075 to .080, phosphorus and manganese below 0.70 except as specified. The last lot of iron is the soft grades for general agricultural implement work. Here the silicon preferred is 2.40, which is a good figure; sulphur not to exceed .085, which seems a little high. For brake shoes .150 is allowed; phosphorus, .70; thin stove plate may run up to 1.25, which is sure to result in many a broken stove door. Manganese below .70 except for chill work, which when heavy may vary from .70 to 1.25. The physical requirements open up a variety of questions. The appearance of the fractured iron as well as its surface, meaning thereby the grain wanted, the absence of cold shuts, slag, cinders, scabs, etc., are perfectly legitimate. The requirements of the hard iron are fixed at not less

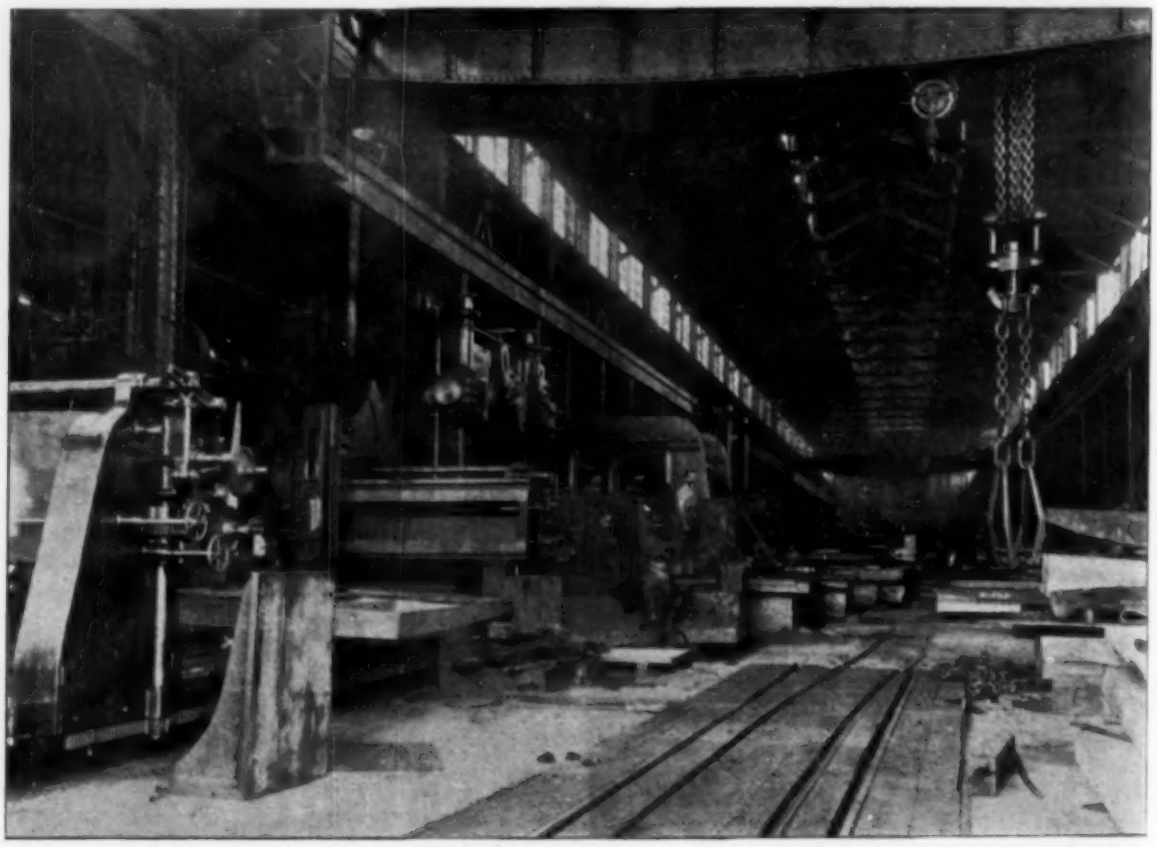


FIG. 2.—HOMESTEAD STEEL WORKS. INTERIOR VIEW OF ARMOR PLATE MACHINE SHOP.

than 2,400 lbs. for a 1-inch square bar, 12-inch supports, with a deflection of not less than .08 inch. Chill and shrinkage requirements are also given, the first being not over ¼" and the latter not over .145" in 12 inches. It would be curious to know what real value the computation of a bar over or undersize to an exact square inch, as called for, would have in view of the practical inapplicability of the laws of mechanics to cast iron. This as well as the absence of detailed specifications for the test bar make it wise to give only a lower limit to the strength required. The tensile strength of the hard iron should be over 22,000 lbs. per square inch. In the medium iron the transverse breaking strain under the same conditions as for the hard iron is to be above 2,200 lbs., deflection not less than .09, chill below .15", shrinkage not over .136," and the tensile strength 20,000 lbs. The soft irons are required to stand over 2,000 lbs., with a deflection of not less than .10," shrinkage not over .127" and chill under .05". The tensile strength should be not below 18,000 lbs. A number of requirements regulating the scrap and steel contents for the various mixtures are given, and on the whole, with the exception of the vagueness of the physical tests, the specifications are good ones.

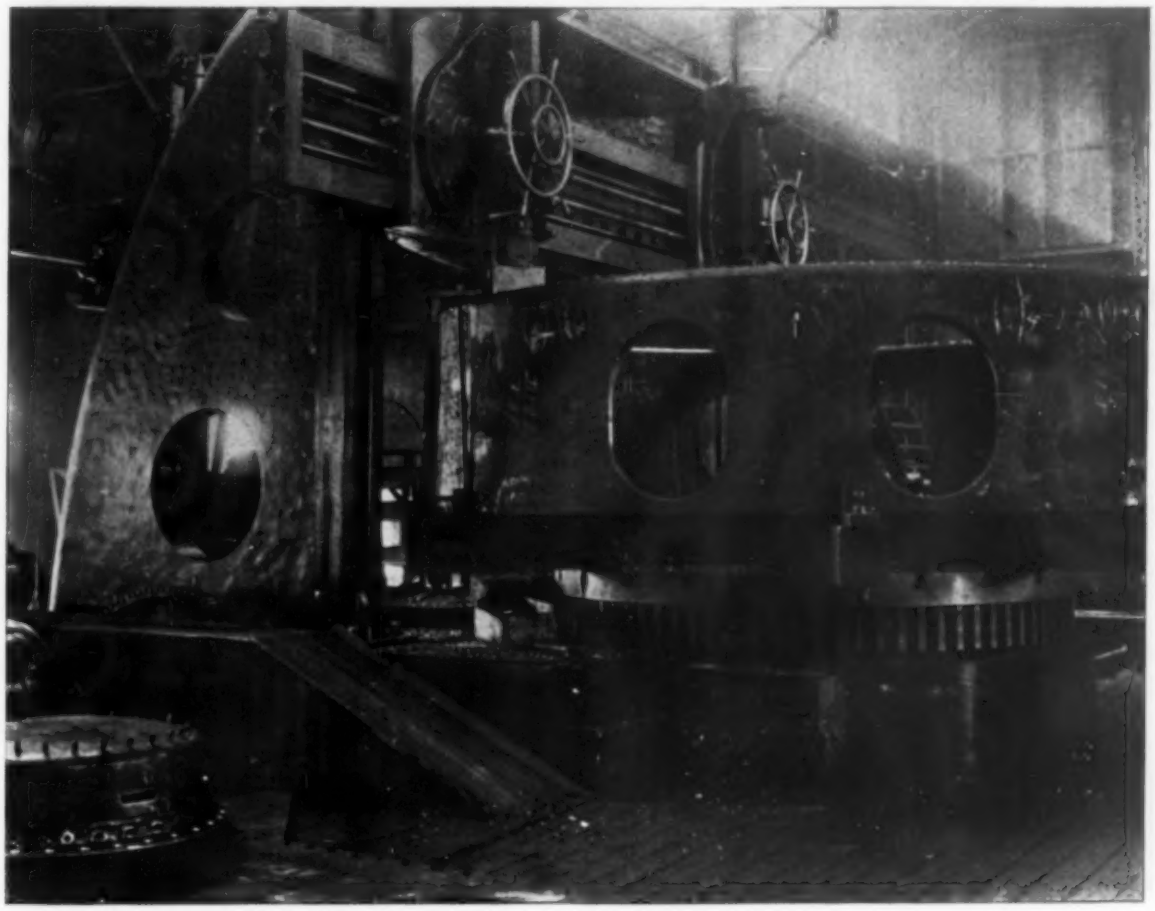


FIG. 3.—HOMESTEAD STEEL WORKS. MACHINING NICKEL STEEL FACE HARDENED TURRET FOR 8 INCH GUNS.

THE EXPERIENCE OF A DROP OF WATER.

As bright a piece of trade literature as the following deserves the prominence of reading columns, though it happens to have been produced originally for use in an illustrated catalogue. It appears anonymously, but we believe we are correct in attributing it to the pen of Mr. J. C. Jones, of Philadelphia:

"Whew, but I'm mad!" said a drop of water, as in the shape of exhaust steam it floated up through the air and across the roof of a factory, to a friendly drop it met coming out of a neighboring mill. "I was told that I could do a lot of good, and at same time cause a heap of trouble by being made into steam and help run a big engine; so, as I was very cold and dirty, and felt full of mischief, I made up my mind to try it.

"Last time I saw you we were together in that city main getting a 40-pounds squeeze along with the rest of the boys. I left you for a trip up to that power plant. Say, the first thing I knew I was right up against a valve—one of that kind they call 'balanced,' which keeps you waiting until you're wanted. Heard somebody say, 'I know where we are now; there's a Cochrane heater right ahead of us—can tell them by the valve.' I didn't like that, and it made me suspicious, because I had been told by my friends who had tried those closed fellows that I would be pumped right through into the boiler just as I was, and before I could say 'Jack Robinson.' We slid through that valve as easy as falling off a log. Blamed if they didn't use us for closing the end of the pipe we came through, so steam wouldn't work back. Phew! maybe it wasn't hot up there in that water box; and when I slipped over the edge onto that hot tray! Two hundred and twelve degrees ain't hot? You can bet your last drop it is. They just spread me out in a thin sheet on that hot tray, and then let me fall through a Turkish bath vapor on to another tray just below the one above. Don't you believe it, that steam gives a fellow the shivers. I actually got hot under the collar, and fell in a dripping perspiration.

"There was more in me than most people realize. You know I had my system toned up with carbonates of lime and magnesia—and sand. I've got lots of it; but this treatment began to phase me, so I left behind some of those carbonates—and all the while no let up to the heat; had me right up to 212 degrees. I had the satisfaction of turning a lot of that exhaust steam into my condition and bringing it along with me. Say, this exhaust steam was different from some that I have met. 'Twas nice, clean steam; I didn't notice any oil about it.

"I was so shaken up by this time that I didn't mind the fall we got into a pool below—just as hot down there, for the other boys that went ahead of us had been through the same treatment. Quiet! Well, nearly; moved very slowly, and right here I lost my nerve and gave up my sand and all that mud that had been using me as a carrier, for we had the crookedest, longest trip through a mass of that filtering stuff they call coke that I ever took, and I had to let go practically all the rest of those carbonates. Talk about your limpid fluids! Why, I didn't know myself, I was so clean after going down through that coke and those perforated plates which hold it up! There wasn't a chance to get back with the other

fe llows on account of a hood about us forming a passage right up to the point where we went through into the pump suction pipe.

"Say, Drop, old boy, I came near blistering that thermometer in this pipe as I went by, and might have done it, only they didn't have the heater and the pipes covered. You know all about pumps. This one pushed me into the boiler. I was so hot when I got there I flashed right into steam the instant I felt the least bit more heat, which made me mad, because I knew the man that owned the boiler was saving a lot of coal on account of this. Then I had no dirt to leave behind on the sides of the boiler, and that made me madder yet, and I didn't even have the satisfaction of helping to wear out that thing I went through first—tried to rust holes in it, but it was made of something I couldn't touch, and besides, the gas which used to help me cut holes in things left me the instant that hot steam struck me, and away it went out through the top of the affair along with the steam that wasn't turned into water when we cold fellows first came in. Say, if you want to have a good time, stay away from that place—worse than a Turkish bath, without the cold plunge. Those fellows were right; they called it a heater and purifier—and it was."

RECENT sales of Cochrane feed-water heaters and purifiers have been made by the Harrison Safety Boiler Works, Philadelphia, to the following firms: Shoenberger Steel Co., Pittsburg, two 2,500-h. p.; Sheffield Electric Co., Sheffield, Ill., one 100-h. p.; Ayer Water Works, Ayer, Mass., one 100-h. p.; G. G. Caldwell, Chicago, Ill., one 100-h. p.; Rosenbaum Bros., Chicago, Ill., one 300-h. p.; Lane & Bodley Co., Cincinnati, O., one 200-h. p.; Kroeschell Bros., Chicago, Ill., one 300-h. p. special; Clinton Cement Co., Pittsburg, Pa., one 300-h. p.; Wm. Waterall & Co., Philadelphia, one 100-h. p.; Barrett Mfg. Co., Philadelphia, one 150-h. p.; Pennsylvania Mfg. Light & Power Co., Philadelphia, one 2,000-h. p.; Washington Coal & Coke Co., Star Junction, Pa., one 500-h. p. Pennsylvania Railroad Co., Broad Street Station plant, Philadelphia, one 2,000-h. p. special; Lebanon Furnaces, Lebanon, Pa., one 1,750-h. p.; Superior Steel Co., Carnegie, Pa., one 500-h. p.; Hooven, Owen & Rentschler Co., Hamilton, O., one 150-h. p.; Chas. Erith & Co., London, Eng., one 100-h. p.; Lane & Bodley Co., Cincinnati, O., one 200-h. p. and one 300-h. p.

RECEIVED FROM THE TRADE.

Edward Brown, 311 Walnut st., Philadelphia, describes in general terms in a circular recently issued, the various forms of pyrometer developed in the 28 years of his career in this specialty. Twenty varieties of pyrometers are manufactured, protected by 18 patents, 14 of which are in force. The recording pyrometer patented in 1896, and for which the John Scott Legacy Medal was awarded in 1897, is illustrated on the cover of the pamphlet. Mr. Brown's original hot-blast and standard portable pyrometers were introduced to the iron trade about 1870, and since that time at least 2,000 have been sold, chiefly to iron and steel works. The new pyrometer brought out in 1893 was for use in annealing ovens and heating furnaces under natural draft, where the temperature is above red heat. It is inserted through the wall into the oven and will indicate the temperature up to white heat in 15 or 20 seconds. The circular also illustrates a patented mercury gauge, a steam gauge, an engine counting register and a revolution indicator, which shows at a glance by the height of a column of mercury the number of turns a minute made by a steam engine.

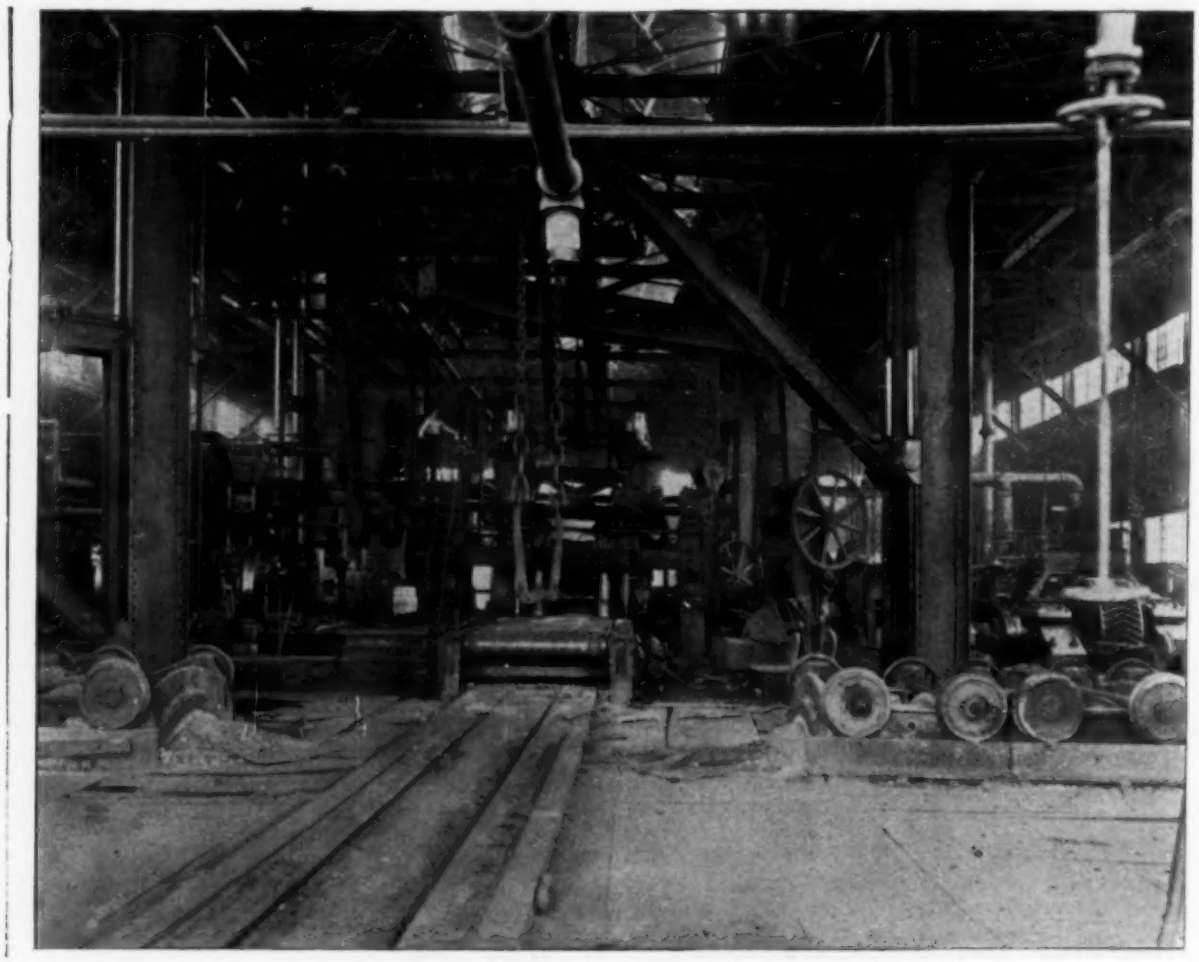


FIG. 4.—HOMESTEAD STEEL WORKS. ARMOR PLATE ROLLING MILL.

Late publications of the B. F. Sturtevant Co., of Boston, are a pamphlet 4x9 inches and an eight-page leaflet, envelope size. The former is on the Sturtevant patent steam hot blast apparatus, and the latter on "Draft without a Chimney," giving the story of the removal at the Sturtevant works of a stack that was no longer of use and the substitution of an engine-driven fan above the boilers, the gases passing directly to it from the uptake and being discharged through a short stack extending just through the boiler house roof. The pamphlet illustrates the solid base and corrugated sectional base heaters, manufactured under patents and operated in combination with Sturtevant fans. Both publications embody the artistic effects in printing and illustration which are studied in all the literature of this company.

The new plant of Harvey Hubbell, of Bridgeport, Conn. greatly improves his facilities for the manufacture of machinery and tools. The latest catalogue of this concern is an attractive piece of illustrative and typographical work. Tapping and riveting machines are given prominence. There are also described, a screw slotter, speed indicator and belt cutter and punch. Brass machine screws and screw machine parts are also represented.

PULLMAN PALACE CAR CO.'S PROSPERITY.

The annual meeting of the stockholders of the Pullman Palace Car Co. was held in Chicago, Oct. 12. The present board of directors was re-elected, as follows: Marshall Field, J. W. Doane, Norman Williams, O. S. A. Sprague, Henry C. Hulbert, Henry R. Reed, Robert T. Lincoln.

The following resolution was passed by the stockholders:

"WHEREAS, The value of the assets of this company exceeds the par value of the capital stock by more than $18,000,000.

Resolved, That for the purpose of representing in the capitalization of this company, existing surplus assets to the extent of $18,000,000, the capital stock of the company is hereby increased 50 per cent, and the proper officers of the company are hereby directed to issue the said additional stock, being 180,000 shares, on the 15th day of Nov., A. D. 1898, and to distribute the same to stockholders of the company, in the ratio of one share for each two shares held by stockholders of record on the first day of Nov., A. D. 1898.

The financial showing is favorable as compared with the year previous. Car earnings are $8,598,837, as compared with $7,743,343 in 1897; manufacturing, rentals, interest, etc., $2,063,892, as against $1,228,002 in 1897; and surplus for the year $2,393,883, as against $1,770,851 in 1897.

Following is the income account for fiscal year ending July 31, 1898:

REVENUE.		
From earnings of cars	$8,598,837	
From patents	12,128	
From manufacturing, rentals, interest, etc.	2,063,892	
		$10,674,868
DISBURSEMENTS.		
Operating expenses, including maintenance of interior furnishings of cars, legal expenses, general taxes, and insurance	$3,776,314	
Proportion of net earnings paid other interests in sleeping car associations controlled and operated by this company	831,634	
Repairs in excess of mileage	793,036	
Dividends on capital stock	2,880,000	
		$8,280,985
Surplus for the year—being excess of revenue over ordinary disbursements, carried to credit of income account		$2,393,883

The report of Acting President Lincoln shows the contracts made by the company in the past year, reviews the operations in the various departments, and says concerning traffic and car work: "The number of passengers carried during the year was 5,356,912, and the number of miles run was 201,295,321. During the previous year the number of passengers carried was 4,852,398, and the number of miles run was 190,562,758. The value of the manufactured product of the car works of the company for the year was $10,368,25[illegible].23, and of other industries including rentals, $1,032,086.50, making a total of $11,400,342.73, against $4,681,618.08 for the previous year. The average number of names on the pay-rolls at Pullman for the year was 5,012, and wages paid $2,702,591.29, making an average of $539.22 for each person employed. The Pullman Loan & Savings Bank shows savings deposits at the end of the fiscal year of $679,332.02, an increase of $175,893.12 compared with the previous year. The number of depositors has increased during the year from 2,028 to 2,593, and the average for each depositor from $248.24 to $261.98.

A meeting of the Board of Directors followed the stockholders' meeting, and at this Robert T. Lincoln was re-elected acting president, Thomas H. Wickes, vice-president and A. S. Weinsheimer, secretary.

THE *Railway Age* estimates that not less than 1,000 miles of track have been laid in the United States since July 1, making the total for nine months, 2,200 miles. According to the work now in progress, it is figured that the year will see not less than 3,000 miles of new road completed. In this estimate renewals or second track and sidings are not considered. The mileage built so far this year exceeds the total for any entire year since 1893. Alaska this year joins the list of territories in which railway construction is in progress, and contributes 20 miles of road, extending from Skaguay north through the White Pass to the international line.

OWING to the fact that the Peace Jubilee in Chicago, Oct. 18 and 19, occurred on the third Wednesday of the month, the regular day for holding the monthly meeting of the Western Foundrymen's Association, it was decided to have no meeting in October. The next regular meeting will be held on the third Wednesday of November.

BRITISH STRUCTURAL STEEL WORKS.

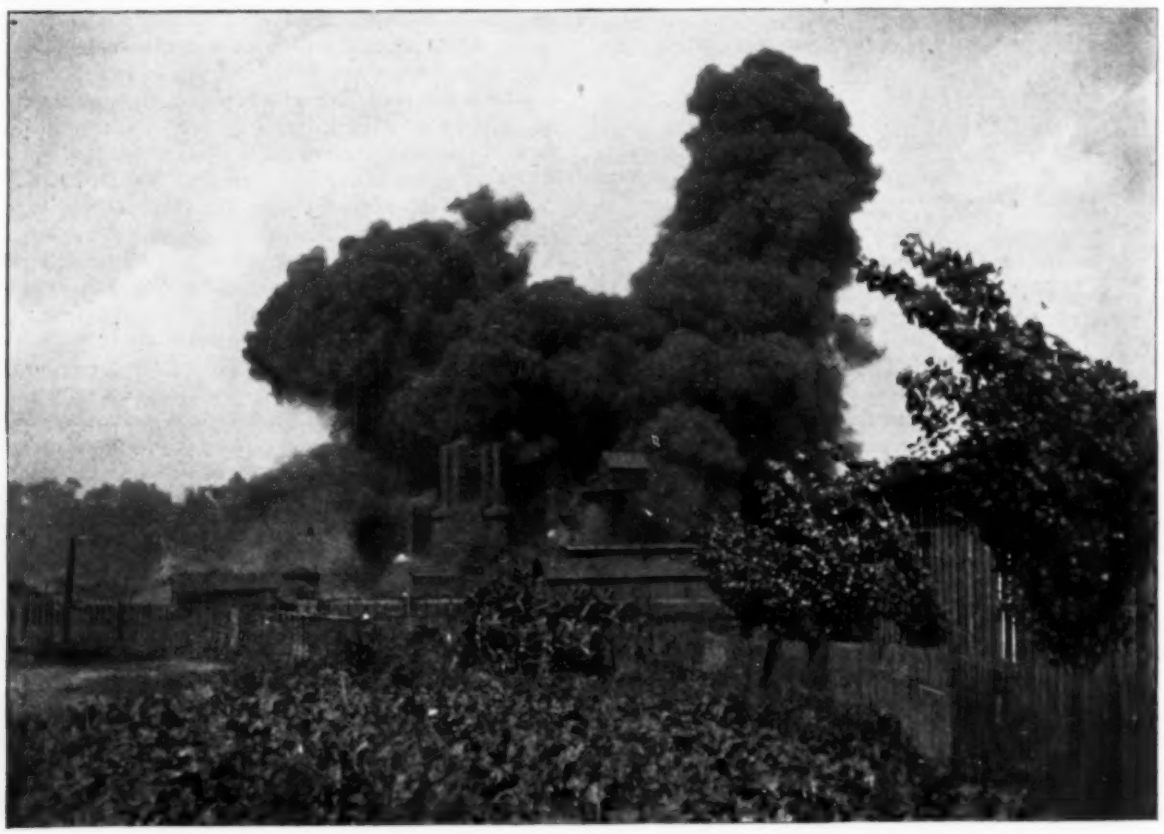
For a number of years past it has been more or less of a reproach to the iron and steel manufacturers of this country that they were less enterprising than they should be, and that they had allowed the Germans and the Belgians to secure a much larger share of the business in girders, beams and similar descriptions of iron than there was any need for. The girder industry has all along been cited as the most "frightful example" of our incapacity and ineptitude. If this reproach were ever really merited, it is now in a fair way of being wiped out. Our Continental competitors do, it is true, still send us large quantities of girder iron and steel, but the amount is diminishing every year, and meantime, this branch of manufacture has been taken up by quite a number of British firms of high standing, including the Shelton Bar, the Leeds, the Butterley, the Frodingham, the Glengarnock, the Staffordshire Ingot, and the Barrow companies, Messrs. Dorman, Long & Co. of Middlesbrough, and Lord Dudley, in Staffordshire. Other firms produce girders and beams on a smaller scale, and usually of small section. The largest sizes rolled in this country are, as yet, smaller than the largest dimensions rolled in the large beam mills of the Carnegie Co. and one or two other firms in the United States, but they are being increased, and no doubt we shall soon be able to record that British firms are doing everything in this direction that has been achieved, or even attempted, in other countries. The largest size rolled at most of the home works is 16 x 6 girders, but in the manufacture of compound girders we have gone probably as far as any of our rivals. The business is a promising one, and offers facilities for considerable expansion in different directions. In the supply of colliery requirements alone there should be a great field open for cultivation that has not hitherto been fully occupied. A number of firms are now laying themselves out for the supply of this branch of consumption, with satisfactory results. It is probable that before long we shall hear of other firms going into the business that have hitherto stood aloof from its seductions. It is understood that Messrs. Bolckow, Vaughan & Co., for example, are proposing to roll girders as an adjunct to the business hitherto carried on by them in rails, bars, etc., and the total plant now or shortly to be available for the girder industry cannot be short of an output of 250,000 to 300,000 tons a year, which means, of course, that the imports from Continental countries are already a relatively small proportion of the total consumption, as well as an absolutely diminishing item.

We would, however, press upon the members of the trade at home that there is still a considerable field to be occupied. We still import from the Continent—and now, to a more limited extent, from the United States—between 60,000 and 70,000 tons of girder iron per annum. With so many British firms engaged in the business this ought to be no longer possible. It is certain that neither Belgium nor Germany can produce as cheap pig iron as we do at home, and, so far as the United States are concerned, any advantage they may have in this direction is more than countervailed, in a general way and in normal periods, by the cost and conditions of transport to Europe. It is therefore a question of the cheapening of the processes whereby the pig is resolved into the finished article. They do, no doubt, command cheaper labor in Continental countries, but they do not possess, as a rule, such cheap fuel, and if our British works are kept up to the highest level of efficiency the result need no longer be doubtful. We are assured by one or two concerns engaged in this branch of industry that they can manufacture girders more cheaply than is possible in Continental countries, and we know of no good reason why this condition of things should not be sufficiently general to enable us to completely retrieve the position we have so long lost to Belgium and Germany in respect of this industry.—[London Iron and Coal Trades Review.

PITTSBURGH firms have received specifications on another large pipe contract. It is for the city of Seattle, Wash., and the pipe is to be used in connection with the water works system. Twenty-nine miles of 42-inch diameter pipe are required, of which seven miles are to be of riveted steel and 22-inch stave pipe banded with steel. The auxiliary high service will be composed of a steel standpipe 30 feet in diameter and 60 feet high. One mile of 30-inch riveted steel pipe is also wanted for a low system reservoir and distribution system.

A TOP EXPLOSION CAUGHT BY A CAMERA.

A unique thing in the records of blast furnace practice is a photograph of a furnace almost at the moment of an explosion. Usually those engaged about the stack are so busy in such emergencies dodging the rain of material, that the spectacular features of the phenomenon get little attention. The illustration below is reproduced from a snap-shot camera, which happened to be in close proximity to Claire Furnace, Sharpsville, Pa., at 1:30 P. M., on Sept. 15. The instant before the picture was secured, a rumbling sound was heard, followed by a heavy report, and immediately the furnace top gave out a great cloud of dust and gases, and quantities of coke, ore, limestone and scrap were hurled through the explosion doors, scattering over a radius of 460 feet. Seventy-five feet beyond the office, which is 350 feet from the stack, pieces of limestone as much as six inches in diameter were found, which were red hot, showing that the explosion had thrown out stock from a considerable depth in the furnace. There was no injury to the furnace, the two six-foot explosion doors doing their work perfectly. Broken windows were practically the extent of the damage. The photograph shows one of the explosion doors closed after having given vent to its share of the eruption.



A TOP EXPLOSION CAUGHT BY A CAMERA. —PHOTOGRAPH TAKEN BY SUPERVISING ENGINEER STRAWN, OF SHARPSVILLE WATER WORKS.

The furnace burden at the time consisted of 37½ per cent of Mesabi ore, 25 per cent of which passed through a 100-mesh sieve. The amount of Mesabi ore had been reduced a short time before from 50 per cent. Two explosions had occurred five days earlier and on the day of this explosion light slips had occurred at intervals.

Lantern slide views of the furnace and of the explosion and data concerning the latter were presented at the Buffalo meeting of the American Institute of Mining Engineers, this week, by F. B. Richards, of M. A. Hanna & Co., Cleveland.

THE Westinghouse Electric & Mfg. Co. has just received a contract for generators, dynamos and motors from the Chinese government, to be installed in a newly erected woolen mill at Tien-Tsin. All the machinery for the mill has been contracted for with Pennsylvania concerns. The contracts were made with John Defenderfer, of Philadelphia, by a representative of the Chinese government. Contracts for engines and boilers for the woolen mill were also let to the Harrisburg Foundry & Machine Co., Harrisburg, Pa., and for textile machinery in Philadelphia.

THE TIN PLATE MARKET.

CHICAGO, Oct. 18.

The past month has shown no activity whatever in tin plates, owing to the disappointing season in can goods, and also because of the generally disturbed market conditions resulting from the trust negotiations. The buyers are showing comparatively little interest in future contracts, and while many of the sellers are offering low prices for deliveries up to and including January, there are few mills that will even name any quotations for the later deliveries. The promoters of the trust have had very little to say to the general public, but from information given out it is generally believed that negotiations are progressing satisfactorily and that options on nearly all of the mills have been secured. It was announced in one of the Chicago papers to-day that the trust was an assured fact; that the underwriting had been completed and that the company would be in active operation within two weeks. This statement is considered a little premature by those conversant with the facts. However, it is generally believed the combination will be consummated before the first of the year, and that this will result in a very different condition in tin plates for 1899.

THE State Labor Commissioners of Indiana have filed with the Governor at Indianapolis a report of their futile effort to settle by arbitration the strike at the Anderson, Ind., plant of the American Steel & Wire Co. In the answers to written questions asked of the company by the commissioners it is stated that the company had attempted to adjust wages so as to make them substantially uniform at its different mills, and so as to allow what was considered fair compensation and all the company could afford to pay, while competing with so many other manufacturers in the same line, many of them paying lower wages; that the company is paying its employes at Anderson about 12 per cent less wages on the average than the American Wire Nail Co. paid, but it is paying a larger wages than the average of all the nail mills of the country. The company added that it had nothing to arbitrate. The commissioners' report will be laid before the next Indiana legislature and it is said will be made the basis of some anti-trust legislation.

THE Fcos Gas Engine Co., of Springfield, O., has increased its capital stock from $50,000 to $100,000.

THE SWEDISH IRON INDUSTRY.

The following is taken from the concluding portion of the paper of Richard Akerman, "Outlines of the Development of the Swedish Iron Industry," read at the Stockholm meeting of the Iron and Steel Institute in August. In the latter part it summarizes the detailed statements of the paper relative to Swedish blast furnace and steel works practice:

The fact that the Swedish iron never had any market abroad for those purposes which, as rails and other building or structural requirements, both absolutely and relatively demand the largest masses of iron, and the other fact likewise hinted at that the use of it in foreign countries for small blacksmiths' wants was gradually limited to purposes demanding higher and higher quality, may lead to the assumption that the sales abroad of Swedish iron have decreased. Comparatively speaking, this may be true; but fortunately the absolute figures of export prove quite the contrary. That, as is clearly shown by the table below, the sales abroad of Swedish iron and steel increased in the present century, is, besides many others, a good testimony of the enormous development of civiliza ion during this century; as, no doubt, it is to that evolution we must attribute the fact that for only a few and comparatively very small articles, far more iron is required nowadays than was the case with almost innumerable purposes some sixty years ago. The said table will also give an idea of the relatively small importance to Sweden of the foreign market in the present time compared with days of old; for, though the figures of export of malleable iron have been nearly quadrupled since 1833, our present export of such iron amounts to scarcely more than 45 per cent of the total production; whereas in 1833 the proportion was 88.5. As is shown by the table, our production of iron has increased still more rapidly than the export of it, and the difference in these respects will give an idea, though a very faint one, of the increase in the consumption of iron in the country, as in this consumption cast iron, rails, structural iron, and other iron intended for construction or building purposes, imported from other countries, especially the United Kingdom, also ought to have been included.

EXPORT OF INGOTS, BLOOMS, BAR-IRON, WIRE-RODS, TUBES, PLATES, NAILS, AND BAR ENDS.

Year.	Quantity of Produced Wrought and Ingot Iron and Steel.	Export.	Export in Percentage of the Production of Wrought and Ingot Iron and Steel.
	Metric Tons.	Metric Tons.	
1833	67,795	60,039	88.56 per cent.
1840	87,547	75,097	85.78 "
1850	95,890	81,715	84.34 "
1860	137,201	102,544	74.74 "
1870	205,986	163,112	79.19 "
1880	256,965	192,274	74.82 "
1890	391,502	245,249	62.31 "
1845	385,305	220,163	57.14 "
1896	444,817	235,630	54.97 "
1897	463,147	209,756	45.29 "

In conclusion, referring to some purely technical questions, it may be observed that the economy in fuel realized in the blast-furnaces in the last decades is rather trifling compared with what was attained by the introduction of hot-blast about 1830, in 1840–1850 by raising the stacks of the furnaces, which up to that time had been very low, and by generally substituting two, or sometimes four, for the single tuyere previously employed. It is true that, since the latter date, a continuous increase in height of the furnaces, particularly in 1860 and the beginning of 1870, and a further increase of the temperature of the blast were followed by an increased economy in fuel, bringing down the consumption of coal per ton of pig iron a little, but in the last forty years the whole reduction scarcely amounted to more than seven or perhaps eight per cent, which, no doubt, is due to the fact that the production of forge pig iron for the Lancashire finery has, in this period, been largely replaced by pig iron for the Bessemer and open-hearth processes, which requires a much greater smelting heat, not always attained by an increase of the temperature of the blast alone. To the last mentioned fact has contributed the circumstance that, from reasons already mentioned, we are limited to very small quantities of production, it being evident that, because of their heavy sinking-fund charge, expensive arrangements for saving fuel or labor cannot be applied to small establishments so advantageously as to those with a large production.

DIMENSIONS OF BLAST FURNACES NOW USED IN SWEDEN.

Height	11–18 meters	(36 to 59 feet).
Diameter of the hearth (at the tuyeres)	1–2.1 "	(3½ to 8 feet).
Diameter of the boshes	2.2–3.1 "	(7¼ to 10¼ feet).
Diameter of the top	1.5–1.9 "	(5 to 6¼ feet).

The capacity of the blast furnaces is 27 to 100 cubic meters. The temperature of the blast varies from cold, which however is very seldom used, up to 800° C., but is generally kept at 200° C. for Lancashire pig, and at 300° to 400° C. for open-hearth and Bessemer pig. Only the furnaces at Björneborg and Domnarfvet are provided with regenerative hot blast stoves, producing a temperature of 700° to 800° C. The consumption of charcoal per ton of pig iron is from 4.8 to 8.2 cubic meters, generally amounting to about 6 cubic meters. As only charcoal made of fir and pine is used, and this in ordinary air-dried condition does not weigh more than 140 to 160 kg. per cubic meter, and only contains about 82 per cent of fixed carbon, the consumption of real carbon per ton of pig iron may be estimated at 0.590 to 1.010, or mostly, about 0.740 tons. The average production per furnace in 24 hours was in 1897 13.1 tons, and only at Domnarfvet figures as high as 40 to 45 tons per 24 hours were reached.

As for the Lancashire fining, the production per hearth has been doubled or trebled in the course of time, and the consumption of charcoal has been reduced in a corresponding degree. To this happy result, besides other circumstances, as especially larger hearths, the machine-breaker, invented by Mr. Y. Lagervall, has greatly contributed. Now the weekly production per hearth generally amounts to 14 to 20 tons of blooms, with a waste of 7 to 15 per cent, and a consumption of 2.5 to 4 cubic meters of charcoal per ton of metal charged.

For the Bessemer process, the pig is taken directly from the blast furnace, and the silicon contained in it is generally 1 per cent or a little more, but commonly it also contains 1 to 5 per cent of manganese. The blowing time varies from 5 to 20 minutes, being as a rule less than 10 minutes, and the waste is from 8.75 to 12 per cent, usually about 10 per cent.

Cheap Materials for Birmingham's Steel Plant.

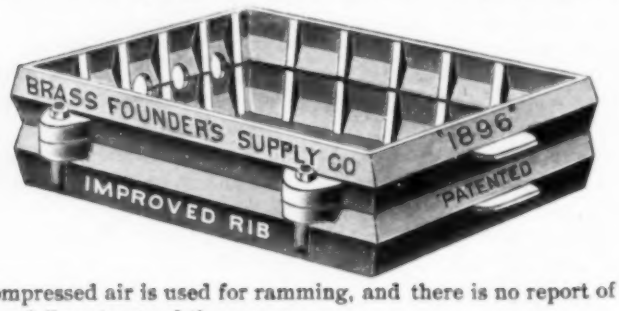
In the announcement made some months ago, of the decision to build a large steel plant at Birmingham, Ala., it was stated that basic pig iron was to be furnished the Alabama Steel & Shipbuilding Co. by the Tennessee Coal, Iron & Railroad Co. practically at cost. The contract on this subject has just been recorded. It provides that in consideration of $440,000 of the preferred stock of the Alabama Steel & Shipbuilding Co., the Tennessee Coal, Iron & Railroad Co. agrees to furnish the former for a period of 30 years, commencing July 1, 1899, all pig iron, coal, coke, ore, limestone and dolomite necessary for its operation, the maximum quantity to be sufficient for the production of 1,000 tons of steel per day. The price to be paid is 10 per cent less than current market price. The gas from 120 by-product coke ovens is to be supplied free of charge. Should there be failure on the part of the Tennessee company to perform its part of the contract, the steel company is authorized to supply itself with needed material from the mines, quarries and furnaces of the Tennessee company.

The stockholders of the Tennessee Coal, Iron & Railroad Co. on Sept. 15 approved an agreement whereby the company is to receive $1,100,000 first mortgage 6 per cent bonds of the Alabama Steel & Shipbuilding Co.; also $440,000 of the 6 per cent preferred stock of the same company. The stockholders also approved an agreement between the company and Messrs. Moore & Schley by which bonds and stock of the steel company are to be transferred to the syndicate in exchange for cash to be provided for the construction work. The syndicate managers above named offer, on and after Oct. 17, to receive from Tennessee Coal, Iron & Railroad Co. stockholders subscriptions for the Alabama bonds and stock, guaranteed by Tennessee Coal, Iron & Railroad Co., upon the basis of $1,000 cash for $1,000 bonds and $400 preferred stock. Twenty per cent of each subscription is to be paid upon the acceptance of subscription and subsequent payments not exceeding 10 per cent per month thereafter. The total possible subscription of $1,100,000 is a little less than 5 per cent of the total stock of the company.

IMPROVED RIBBED FLASK.

The illustration shows the patented improved ribbed flask made by the Brass Founders' Supply Co., of Newark, N. J. It has been on the market about three years, superseding the old style of plain bevel flasks in most of the large foundries in this country as well as in England. These flasks are accurately milled, an improvement on the old way of planing, as every machinist has proved the impossibility of planing a light thin casting, such as a flask, without springing out of true. The company makes its own machinery from special designs of its own invention, and is prepared to make flasks and other goods at a much less cost than by the old process of planing.

This flask is the same shape as the old plain bevel, with the addition of the ribs, which greatly strengthen it, prevent shifting of the mold and thus produce more perfect castings. The flasks are fitted with steel pins and made interchangeable. In pressing with molding machines, they have not been found to spring. A large number are now in use where



compressed air is used for ramming, and there is no report of any failure to stand the pressure.

Besides flasks, the Brass Founders' Supply Co. makes a full line of foundry supplies, including furnaces, core ovens, drying stoves, wood clamps and molding boards, also gray iron castings.

Iron and Steel Production of Canada in 1897.

The current issue of the *Bulletin* of the American Iron and Steel Association gives the production of iron and steel in Canada in 1897. Pig iron to the amount of 53,796 gross tons was produced last year, against 60,030 tons in 1896, 37,829 tons in 1895 and 44,791 tons in 1894. Charcoal iron in 1897, a little over 8,000 tons; Bessemer iron, 11,550 tons. Stocks Dec. 31, 1897, 20,265 tons, as compared with 29,320 tons one year previous. Neither ferro-manganese nor spiegeleisen was made in Canada last year, but it is expected that the Mineral Products Co., of Hillsboro, New Brunswick, will make ferro this year, having leased the Bridgeville Furnace, at Bridgeville, Nova Scotia, for this purpose. Briquettes of manganese ore will be used. The annual capacity of the furnace is about 7,300 gross tons.

On Dec. 31, 1897, there were eight completed blast furnaces in the Dominion, and of this number four were in blast and four were out of blast on the date named. On Dec. 31, 1896, there were also eight completed furnaces, but only two were in blast, six being idle. In the spring of 1898 the Deseronto Iron Co., Ltd., began building a charcoal furnace at Deseronto, in the Province of Ontario, and will start it in November. The annual capacity will be 12,000 gross tons.

The production of basic and acid open-hearth steel ingots in 1897 was 18,400 gross tons, against 16,000 tons in 1896 and 17,000 tons in 1895. Of the total production of open-hearth steel in 1897 a little less than three-fifths was made by the acid process. The production of open-hearth steel rails in 1897 amounted to 500 tons, against 600 tons in 1896; structural shapes, 4,300 tons, against 4,540 tons in 1896; cut nails made by rolling mills and steel works having cut-nail factories connected with their plants, 202,939 kegs of 100 pounds, against 196,971 kegs in 1896; plates and sheets, about 2,000 tons, against 1,820 tons in 1896; all other rolled products, excluding muck and scrap bar, blooms, billets, sheet bars, etc., 61,161 tons, against 59,290 tons in 1896. Changing the cut nail production from kegs of 100 pounds to gross tons of 2,240 pounds the total quantity of all kinds of iron and steel rolled into finished products in the Dominion in 1897, excluding muck and scrap bar, billets, etc., amounted to 77,021 tons, against 75,043 tons in 1896 and 66,402 tons in 1895. The total number of rolling mills and steel works in Canada on Dec. 31, 1897, was 17. Of this number at least three were idle during the whole of 1897.

WHEEL ASSEMBLING MACHINE.

It has been a study among the manufacturers of bicycles to secure the best machines for quickly and accurately assembling the wheel. The original wheel assembling stand of the Fox Machine Co., Grand Rapids, Mich., had a large sale; but it was found that the top of the machine would be more convenient if it were made to revolve so that the operator would not have to walk around the stand in setting up the nipples, also that with additional pressure on the arms the wood could be more easily forced into a true circle. In the new ball-bearing stand the company has retained all the good features of the old machine and has brought out a construction which will permit of putting in 20 arms so that they can be used successfully for 40 spoke wheels. The top disc, which carries the expanding arms, has a groove turned in its periphery with radial slots milled into its face to receive the arms. The pin or pivot in the arm fits into the groove in the outside of the disc, insuring a perfectly concentric bearing, and every one of the arms is milled to a template, so as to come perfectly true when expanded.

The arms are expanded by means of a hand wheel, which is shown below the disc. This is attached to a coarse pitch nut, the upper face of which carries balls that reduce the friction between the nut and the expanding wheel to a minimum and enables the operator to get a heavy pressure on the rim, holding it perfectly true even if warped before it is put into the machine. The sleeve which carries the head of the machine is mounted loosely on the spindle, so that the whole can be revolved to bring the different spokes in front of the operator. The top of the spindle is bored with a Moss taper hole carrying the spindle which is fitted to the ball-bearing on the hub.

Four arms are bolted to the disc, carrying a dowel pin at

their top. This carries the spider which centers the top of the spindle, relieving the latter from the strain of the spokes as they are drawn up from different directions.

Though this is not constructed specifically as a wheel-truing machine, it is the experience that if the rim is true when it is put on the machine and each spoke is drawn up with the same tension, the wheel will be perfectly true when it comes out and will not need to go upon the truing frame. A clear space has been kept around the arms, so that the operator can get readily at the spokes and nipples to set them up.

We have received the pamphlets on the "Manufacture of Coke in 1897" and the "Production of Coal in 1897" prepared for the 19th annual report of the United States Geological Survey by E. W. Parker. Summations of these statistics have appeared already in our columns. The salient fact in connection with the production of the Connellsville region, which was 6,860,826 short tons in 1897, against 5,462,490 short tons in 1896 and 8,181,179 in 1895, was that an advance in the price of Connellsville coke in 1896 to $1.75 at the oven stimulated somewhat the production in other districts.

A METALLURGICAL COMPANION.

The following apt parallel between the operations of the blast furnace and some of the functions of the human system has had limited circulation among the friends of the writer in pamphlet form. We are glad to be able to reproduce it for the benefit of our readers. The writer is Mr. James Gayley, of the Carnegie Steel Co., Ltd.:

From the earliest ages man has always found companionship in, and invested with human characteristics, the various inanimate things with which he is daily associated. Primitive man personified the natural objects about him. The trees were to him as individuals; the sighing and singing of their foliage were full of meaning; their tongues spoke a language he could unde stand. They told him of storms and tempests, of drought, of approaching seasons, and much else. Stanley, in the recesses of an African forest, mused on their resemblance to the human family, and imaged the seven ages of man in the trees.

When man began to use the materials of nature for his tools, to make a weapon of the knotted sapling, and to use for his first water transport the bark of a tree, there was added to his former vague feeling, a sense of real dependence which invested with human or more than human attributes the product of his skill. Jason and the Argonauts, in their search for the Golden Fleece, consulted as an oracle the sacred oaken bough, hewn from the forest of Dodona, to form the prow of their good ship Argo. The sailor of to-day feels that his ship is more to him than a fabric of wood and sail. It is a creature, with moods like his own, and responds sympathetically to his various moods. The engine driver, sitting in his cab and listening to the harmonies which tell him of speed and perfect adjustment, rests his hand with love and solicitude on the throttle, and speaks of his machine most tenderly as "she." And no manager of a blast furnace —that mammoth crucible in which iron is won from its ores—but learns in his daily intercourse with it, stationary though it be, to note the startling resemblance of the object of his care, both in the nature and method of its operations, to a human being. A layman might pass by the tall, dignified and uncommunicative blast furnace and give all of his attention to the more brilliant and voluble Bessemer converter, with its roaring flame and beautiful pyrotechnics; yet a more intimate acquaintance would win him to a deeper attachment for the furnace, because it works with materials fresh from the earth and is therefore closer to nature.

At first sight there is nothing in a blast furnace that is attractive save a certain majesty of greatness. It is a tall cylinder of iron, resting upon a circle of iron columns. This cylinder is lined throughout with fire brick made of the most refractory material in order to protect the iron jacket from the fierce chemical action within. In a line with the furnace and nearly as high, stand three or four large cylinders called "hot blast stoves," which are used for heating the air blast from the engines to a temperature of about 1,300 degrees. The interior of these is arranged with numerous checkerwork openings constructed of fire brick. The waste gases conducted from the furnace are burnt in these stoves and passing through, impart heat to the brick work, which absorbs it rapidly. A ponderous engine is provided to feed in the air so that the giant can breath and digest his rough food. The air from the engine is forced through each stove alternately, after the gas has been shut off, and taking up the heat stored in the brick work, carries it to the furnace, where it is of great service in intensifying the combustion of the fuel. Rough and strong are all of the appliances of a furnace, and well may they be, for rugged men wheel barrows filled with jagged coke, hard limestone and ore from the piles to an elevator, by which they are taken to the top of the furnace and dumped into its mouth. The arrangement for closing this opening so that the men can empty the barrows without being burnt is very ingenious. A circular hopper made of iron rests on the top of the furnace, and in the opening is suspended a bell-shaped stopper, of such dimensions that the bell at its widest flare is a few inches larger in diameter than the opening in the hopper. This hopper is made in two sections. The lower one, which is called the lip ring, is the smaller, and fits with its beveled sides, tightly into the bottom of the upper section, where it is secured with bolts. The bell is raised by means of a strong lever until it binds on the hopper, above which point it cannot go, and with which it makes a joint so tight that even the gas cannot pass through. The sides of both bell and hopper each deflect from this bearing point, and provide a convenient receptacle for the materials. When the space is filled and the bell is lowered, the whole mass rolls in to its destiny, and tongues of fierce flames shoot high in the air licking the lip-ring as if the furnace was eager for its meal.

The internal shape of a blast furnace is that of the frustra of two cones joined at their bases, the upper one being the longer. That part of the brick lining which extends below the iron jacket, and within the circle of the columns, is kept cool by water circulating through hollow plates that are built into it. At the lowest point of the furnace, and on a level with the ground, is an opening to let out the molten iron, which, when not in use, is stopped with fire clay. At regular periods, from four to five times a day, according to the amount of product, the iron is withdrawn or "cast" through this opening, and run into small channels which mold it into bars called pigs; as the iron runs down the main gutter from the furnace, it is diverted into side gutters called "sows," which in turn supply shorter and smaller ones, connected therewith at right anlges; these small gutters are the "pigs," and in looking down the cast house, there are seen the bars of pigs joined to the sow, which, no doubt, recalled to the early makers of cast iron, the sight of a pig suckling its young, and thus the name —"pig iron," that it has ever since borne, was derived. A few feet above the iron opening, and a little to one side, is a similar one for the withdrawal of the slag. This is so located because the slag is lighter than the iron and floats on it. At another rise of a few feet the walls are pierced with openings for the admission of the air blast. These openings are protected by conical shaped copper castings called tuyeres, which are made hollow for the circulation of water, because they are exposed to a very great heat. These tuyeres are connected by suitable pipes to the blast engine, which forces the air into this part of the furnace, which is called the hearth, in large volumes and under high pressure.

The beginning of operations in a blast furnace is not without interest. After the interior is thoroughly dried, cord wood is placed in the bottom and the interstices are filled with light kindling wood and shavings. On the top of these is placed a large quantity of fuel for the purpose of thoroughly heating the furnace. Above this fuel, begins the distribution of the regular furnace diet, consisting of a layer of fuel, a layer of ore and of limestone, each of a specific weight and charged in rotation. This is the whole menu of the blast furnace, and never changes during its entire life. When the furnace is filled in the manner described, all the workmen are assembled, and a fair Helen, whose graces, like good genii, preside over the destiny of the blast, applies the torch; and, as the flames shoot into the interior of the hearth, the furnace is cheered for good luck and a glorious campaign.

There are two great currents in a blast furnace, the solid material traveling downward, and the gaseous upward. The incandescent fuel in the hearth combining with the oxygen brought in by the blast, produces a strong reducing gas, which passing upwards, woos and weds the oxygen in the ores, leaving the iron divorced from its companion of unnumbered ages; truly a rascally robber this, but we condone its offence by reason of the commercial blessings it bestows. So tenacious is this gas of its purpose to rob the ore of all its oxygen, and having no time to tarry, as it is a rapid traveller, it scatters in great profusion over the ore, small particles of carbon to glean the last atom. The limestone carries away as a slag, the dross and earthy impurities, while the iron, purified by fire, melts, and falls in jeweled drops into the hearth.

There is a remarkable similarity in the nature of the functions performed by the blast furnace and by the human body. Both are mechanisms for combustion. Both have a respiratory and a digestive system. Into each, air is forced by a bellows. Into each, is fed a certain amount of raw material, from which each abstracts the useful elements, rejecting the rest. In each a prominent and necessary constituent of the food is carbon. In each also the waste product of combustion is carbonic acid gas. When carbon is burnt in our bodies, it produces heat and vitalizes our system. So in the furnace, carbon in the form of charcoal, coke, or anthracite coal,

forms a large part of the charge. By its rapid combustion, heat is obtained for wresting the iron from its oxydized state, one of absolute rest, and changing it into the metallic state, which is one of ceaseless activity; and having thus done its work, it also passes off as carbonic acid gas.

The functions being so nearly alike, it must follow that there is a similarity in anatomy and likewise in pathology. I have already referred to the mouth into which the charges are fed; also to the hearth where the fuel is burnt as it is in our lungs. The digestive tract, throughout which great chemical reactions take place, occupies the space between these two points, or almost the entire furnace. The pipes conducting the air to the tuyeres are fitted at the bend, with small glass eye pieces, by means of which the bright combustion of the fuel may be noted. In looking at a blast furnace, these glass covered openings arranged in a row around the hearth, look like so many eyes peering out at one in their inquisitive brightness, and such indeed they really are, and, like other eyes, they have every variety of expression, from the most star-like to that of the deepest melancholy; and by their expression, the manager is able to judge of the condition of the interior of the furnace. When they are bright and sparkling, things are in perfect adjustment and working satisfactorily, but when they assume a yellowish hue, it presages a bilious attack, and a physic must be administered. On the other hand, should they indicate that it is only a slight attack of indigestion, resort is had to that old fashioned remedy, a dose of charcoal, or coke, which experience shows is a most efficient one. The main blast artery conveying the air from the engines to the furnace, has attached to it a gauge for the purpose of indicating the pressure of the blast, and the variations thereof are noted as carefully as ever physician notes the pulse of his patient. The air passing through this pipe has been heated by the waste gases escaping from the top of the furnace, and the temperature is carefully adjusted to the conditions noted in the hearth. When the combustion becomes too rapid, and a feverish heat prevails, the temperature must be lowered. The normal condition of a man, and the one wherein he can perform his work in the most thorough and satisfactory manner, is, when he has warm feet and a cool head; likewise a blast furnace does its work most efficiently when it is operated under conditions which insure a hot hearth and a cool top. When water leaks into the hearth, it interferes with the combustion, lowers the temperature, and has the same effect on the furnace as wet feet have on a man, producing cold. Sometimes, but rarely, the furnace succumbs to a congestive chill; then truly its functions are disturbed, its whole anatomy grows weak and languid, and it may die an untimely death, unless its physician, the manager, can lure it back to life by the proper application of heat. Indeed the blast furnace requires a corps of physicians constantly, and occasionally demands their active services day and night, since furnaces are sometimes in a condition of utter collapse for several days at a time. No furnaceman tending a sick furnace throughout the day and the silent watches of the night, but has, at the first signs of recuperation, a feeling somewhat akin to that of a sister of mercy, as she notes after her night's vigil that the crisis has been passed. At all times, even in a state of health, a furnace requires constant attention and watching, for the various features of its operation are so intimately dependent upon each other, that unless all are considered, great irregularity will ensue. Since it cannot speak, such diagnosis has to be made entirely from external symptoms. It can readily be seen that intelligent discernment is demanded, in order to preserve harmony of operation, and yet it is unfortunately true that the management of this costly and delicate mechanism is too often entrusted to any strolling furnace player that happens along.

It must not be supposed that the usual condition of a furnace is one of chronic ailment; on the contrary, it is one of good health, although the adjustment is so delicate that even so slight a change in the conditions as an increase in the quantity of moisture in the atmosphere, will produce a derangement; but given properly prepared food, at regular intervals, and maintaining uniform conditions as to temperature and quantity of air, the results are always satisfactory. One can readily understand how this constant care engenders a strong feeling of attachment, which is fortunate; for in its various moods, a furnace is as capricious as a child, as winsome as a maiden, and as stubborn as a mule.

It is a pleasure to see how proudly the smoke curls from the top of a furnace in perfect adjustment, at whose highest peak is nailed a broom, indicative of its achievement in having swept away all previous records in the world; and, standing in its shadow, we unconsciously uncover our heads, as before the great among men, at this mighty display of power, which silently and without apparent effort, wrests the energy of the sunbeam from its fueled storehouse to break the union of iron and oxygen and to place at our disposal the most precious metal known to mankind.

INDUSTRIAL SUMMARY.

New Buyers in the Market, and Some of Their Wants:—

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

New machinery will be purchased for the plant of John R. Price, of Stonersville, Pa., recently burned, and machinery catalogues are solicited.

At Wheeling, W. Va., the Co-operative Stove Co. has been organized to build and operate a foundry for the manufacture of stoves and heavy castings.

Pendley & Dagley, Plainview, Tex., ask prices on blacksmith's supplies.

Charles R. Ross, Madisonville, Ky., is in the market for complete equipment for machine shop; new and second-hand lathes, drills, pipe-threading machines, screw cutters, milling machines, planers, etc.

The board of park commissioners of St. Paul, Minn., will open bids Nov. 7 for two 18 ft. by 54 in. tubular boilers.

The Reeves Machine Co. has been incorporated at Trenton, N. J., to manufacture engines and general machinery. Capital, $100,000. Incorporators: Clifton Reeves, Charles M. Heath and Linton Satterthwait, of Trenton, N. J.

The Cyclone Woven Wire Fence Co., which has decided to locate at Waukegan, Ill., has purchased lots and plans for the buildings will soon be prepared. This enterprise will be a consolidation of the North Chicago and Holly, Michigan factories. The company also has a branch at Beaver Falls, Pa.

The Springfiled (O.) Roller-Bearing Axle Co. has been incorporated for $50,000 by E. S. Kelly, J. E. Bowman, B. I. Tuttle.

New Construction:—

The Riter-Conley Mfg. Co., of Pittsburg, has the contract to build for the Mexico City Tramway Co., City of Mexico, to erect an engine and boiler house, a main building and a coal storage building. About 300 tons of structural steel will be required.

The Illinois Central Railroad Co. has bought 75 acres of land near Lousiville, Ky., and may build shops in the near future.

A foundry will be erected at Ellwood City, Pa., by E. J. O. Davidson and Scott Coates, lately connected with the Derwent Foundry Co. The main building will be 40 x70 feet.

The Melrose Park, Ill., plant of the Latrobe Steel Co. will be 300 feet long, with a span of 85 feet. It will be completed in 90 days.

Machinery is being installed at the new plant of the Michigan Malleable Iron Co., Delroy, Detroit, and the works will start in November.

The Ft. Pitt Bronze & Brass Co., Allegheny, Pa., has started up successfully. At the Pennsylvania Car Wheel Works, adjoining, which are under the same management, the volume of business has necessitated a new building 50x90 feet, the contract for which has just been taken by W. B. Scarfe & Sons.

The Titusville Iron Co., Titusville, Pa., is erecting an addition to its radiator plant, a brick and iron building, 418x80. A new machine is employed for molding radiator sections and a saving of iron is made by the new method.

The Minnesota Iron & Steel Co. has decided to go ahead with the erection of an open-hearth steel plant in connection with their rolling mills at Columbia Heights, near Minneapolis. Ground will be broken the early part of next week, and the work will be pushed forward to early completion. The new additions will consist of one main building, 60 feet by 180 feet, in which will be located two 15-ton open-hearth furnaces, with all the necessary casting arrangements, etc. The new department will be equipped with electric power, traveling cranes, charging machines, etc. Electric power will be used throughout the new plant and will, to some extent, be adopted in the older departments. The abundance of all kinds of steel and cast-iron scrap, also close proximity to iron ore, are advantages which the company will enjoy. The contracts for the iron buildings for the plant have been placed with the Gillette-Herzog Mfg. Co., of Minneapolis. The company will place additional contracts for furnaces, casting machinery, etc. The new department will be completed and ready to place in operation by Jan. 1, and will have a capac-

ity of 20,000 tons per year of finished steel. In addition to the production of steel, the company will continue to manufacture a considerable tonnage of refined bar iron. The product of the rolling mill company, with the aid of its new steel department, will consist of both bar iron and soft steel bars, flats, plates, wagon and buggy tires, nuts, bolts, drift pins, harrow teeth, steel castings, etc.

At Portland, Wis., Wm. Bates is erecting a new foundry 20 x 60, two stories, with a lean-to.

Bids are being canvassed for the new plant of the Alcania Tin & Terne Co., at Avonmore, Pa., after designs by S. Diescher, of Pittsburg. Two mills will be built at once and it is expected to add four later.

The Tennessee Coal, Iron & Railroad Co. Birmingham, Ala., will start at once on its new iron foundry, which is to be 80 x 240 feet.

The Ellwood Foundry Co., Ellwood City, has secured ground, 200 x 160 feet, on which it will erect a plant. The main foundry will be 50 x 85 feet, one story high. There will be additional buildings for pattern shop, machine shop, sand sheds, core ovens, coke house, etc. The new company will make castings for gas engines, and a general line of machinery castings.

The Olds Gasoline Engine Co., Lansing, Mich., has absorbed the Olds Motor Vehicle Co., and increased its capital from $50,000 to $150,000. Land has been purchased and a large new plant will be erected, with double the present capacity, and 350 hands will be employed. The company will manufacture the Olds horseless carriage, in addition to gasoline engines.

Additions, Enlargements, Removals, Etc.:—

The Berlin Iron Bridge Co., East Berlin, Conn., is erecting the extension of the foundry for the Benjamin Atha & Illingworth Co., at Harrison, N. J. This extension is 51 feet wide and 152 feet long, with framework of steel throughout. The sides are covered with corrugated iron on steel purlins, and are arranged for suitable doors and windows. The side columns support a 30-ton electric crane, having a span of 46 feet. The roof construction is of steel trusses and purlins arranged with openings in the roof for skylights.

The Totten & Hogg Iron & Steel Foundry Co., Pittsburg, Pa., manufacturer of engines, rolling mill and tin plate machinery, has the contract to enlarge the plant of the Johnstown Tin Plate Co., Johnstown, Pa. The plant will be increased by the addition of two 24 x 32-inch hot mills, one 20 x 36-inch cold mill, one 26 x 48-inch Ætna engine, two belt-driven doubling shears, two blocks of sheet and pair furnaces, one annealing furnace and one 150-h. p. boiler.

The Titusville Forge Works, Titusville, Pa., are greatly increasing the capacity of their plant by the addition of two buildings and the putting in of new machinery which will enable the company to turn out more and heavier work, and which will necessitate the employment of an increased force. An addition to the forge department will be 75 x 100 feet and 30 feet high. The other building will be an extension of the machine shop and will be 50 x 100 feet and 30 feet high. The forge building will be equipped with a six-ton Morgan steam hammer, a 1,200 to 1,500 pound steam hammer, with improved furnaces, and two 30-ton steam cranes.

An addition to the plant of the Pittsburg Reduction Co. at New Kensington, Pa., is in course of construction. The new department will turn out aluminum wire and give employment to about 40 men.

The Johnstown tin plate mill, which has been running night and day since it started, and being still unable to fill orders, will be doubled in capacity in the near future.

The Anderson-DuPuy Steel Co. has decided to make improvements to their plant at McKees' Rocks, Pa., in the near future. The plant will be enlarged, additional furnaces installed and a building will be erected for the placing of a battery of boilers. It is said that the improvements will cost about $30,000.

Fires and Accidents:—

At Ft. Wayne, Ind., the Kerr-Murray foundry fuel room and foundry building was damaged by fire to the extent of $5,000.

At Hanover, Pa., the Keystone Wheel Works, Henry Yeager, proprietor, were destroyed by fire The loss on the building is $2,000, and on the stock and machinery $15,000.

An explosion of one of the stoves of Hannah Furnace at Youngstown, O., which recently went in blast, caused considerable damage Oct. 14. One man was killed.

The shops at the Shenandoah City Colliery, Shenandoah, Pa., with machinery and tools, were burned Oct. 11. Loss $5,000.

The explosion of a mold at the plant of the T. B. Laycock Mfg. Co. just after the metal had been poured into it, set fire to the building, some of the molten metal igniting a quantity of naphtha. Loss is considerable. Insurance, $35,000.

Fire at Tyler, Tex., destroyed the warehouse and platforms of the Tyler Foundry & Machine Co. The warehouse was full of machinery. The loss is $10,000, insurance $5,000.

The Oliver wire mill, on South 9th st., Pittsburg, was shut down last week on account of an accident to the machinery. The cylinder head of the engine in the roughing department was blown out. The accident will cause a shut-down for about a week.

The National Iron Works of J. H. Boyd, at Spokane, Wash., burned with $30,000 loss; partly insured

Fire in the Kerr-Murray foundry at Ft. Wayne, Ind., caused $5,000 loss.

General Industrial Notes:—

The contract for equipping the Third Avenue Railroad of New York with electricity is pending and will soon be decided. It is expected that $4,500,000 will be spent in the electrical equipment. The telegraphed report that the Westinghouse Electric & Mfg. Co. and the Walker Co. would receive the contract was incorrect, but may be simply premature. A contract for 15,000 tons of 110-lb. rails is also pending, and one for 3,500,000 pounds of steel castings.

Thirty molders struck at the plant of the Rock Island (Ill.) Plow Co., Oct. 13. Last season under the piece-work system they made from $2.50 to $2.75 a day; this year 22½ cents an hour was the schedule.

A new record was made at the converting mill of the Edgar Thomson Steel Works, at Braddock, Pa., Oct. 14, making 91 heats in 12 hours, with a total weight of 1,400 tons. This quantity of steel was made with three vessels. The best previous record was made by the same mill three years ago, with four vessels.

The P. L. Kimberly Co., Sharon, Pa., is making some repairs at its Atlantic works and is putting in a new engine.

The Weimer Machine Works Co., of Lebanon, Pa., has received an order from the Lebanon Furnaces, Lebanon, Pa., for a Uehling pig iron casting machine, also for five 20-ton ladle cars, for carrying the hot iron from furnace to casting machine. The company is also building the gas ore roaster for the same furnace.

A. H. Kerkhoff & Co., a Cincinnati machinery firm, have made an assignment. They have been in business seven years.

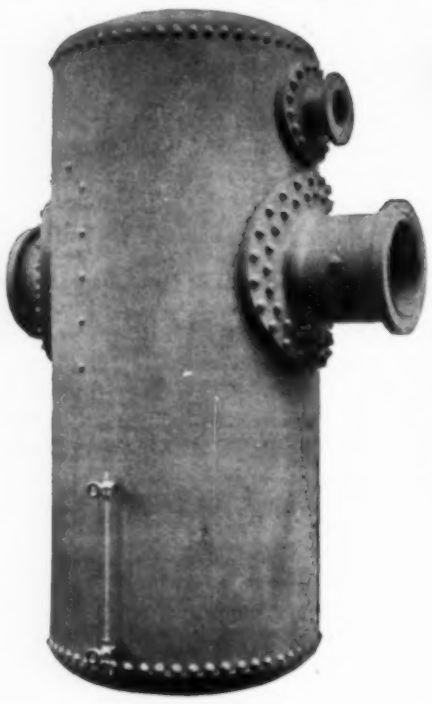
A very large engine shaft is being constructed by the Bethlehem Iron Co., of South Bethlehem, Pa., for the Corliss Steam Engine Co., of Providence, R. I. This shaft will be 27 feet 10 inches long, with a maximum diameter of 37 inches, a bearing diameter of 34 inches and a diameter of 32 inches where the crank disks fit on. Throughout its length is a 17½-inch hole. It is estimated that the finished shaft will weigh about 63,000 pounds. The specifications call for an elastic limit of not less than 50,000 pounds per square inch and an elongation of 18 per cent in a round test piece 1x10 inches.

The Fernstrum Boiler Works, Menominee, Mich., is installing boilers and erecting a 75-ft. stack for the A. W. Stevens Works at Marinette.

The Hammond, Ind., sheet mill has started up under the management of the new company, in which Messrs. Sykes, of Niles, O., Leitch and others are prominent.

A circular of the Heer Machine Works, of Alliance, describes the Heer protected screw jack, the Rue trenching brace of which this company makes a specialty.

Among recent car business are 500 coal cars for the Union Pacific and 300 for the Delaware & Hudson; 200 freight cars for the Mexican Northern; 100 furniture cars for the Fitchburg; 50 box cars for which the C. H. V. & T. is in the market; 500 freight cars about to be ordered by the M. K. & T.; 300 stock cars for the Southern Pacific, building at Hunting



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The shells of our Cochrane Steam Separators and Receivers are most carefully designed for the specified working pressure, and constructed of the best materials skillfully and substantially put together.

The interest centers, however, in the internal parts, by which these shells are transformed from ordinary tanks for holding a reserve supply of steam, into appliances that will stop and hold a sudden rush of water as well as separate small quantities of moisture from the steam, while giving the same advantages as to storage capacity.

Our catalogue illustrates and describes some twelve different types or forms of the Cochrane Separators, giving particulars of over a hundred sizes. Of our oil separators (for purifying exhaust steam from oil, cylinder and crank case) alone, we have placed in successful service some 1,400, ranging in size from 1 in. to and including 24 in.

Most of the scale which now finds its way into Boilers would never get past a Cochrane Heater, and a Cochrane Heater is the easiest thing to clean imaginable.

ton, W. Va.; 75 refrigerator cars for the Hammond Packing Co.; 100 cars to be built at the C. & O. shops; 100 freight cars building for the Norfolk & Southern at Ensign Mfg. Co.'s shops.

Wm. F. Forsyth, of the iron firm of Forsyth, Hyde & Co., Chicago, has filed a petition for bankruptcy. The principal creditors are the York Iron Co., $30,317.35; First National Bank of Fond du Lac, Wis., $55,147.39, and the Southern Michigan National Bank, $7,200.

The Armourdale, Mo., plant of the McKenna Steel Working Co. has closed down awaiting the accumulation of orders. The Joliet plant is running.

G. A. True has been appointed receiver of the Frontier Iron Works, Detroit, on the petition of Duncan Symington, Thomas K. Christie and William V. Moore, of the board of directors and heavy stockholders. They set forth that the works have not proved remunerative the past three years because of insufficiency of cash capital, and that the stockholders do not choose to put up more. The petitioners are agreed that the institution should be wound up. The capital stock is $117,000, of which $78,000 is paid in. The property is encumbered with a mortgage on real estate, machinery and tools, to Wm. V. Moore, trustee, for $30,000, with interest at 6 per cent, payable semi-annually; dated Nov. 27, 1895; due Nov. 27, 1898; given to secure $15,000 cash advanced, and all indorsements made at any time by Mr. Moore.

The Bates Machine Co., Joliet, Ill., announces that the proceedings instituted against it about two years ago in the United States Courts by the Excelsior Heater Co., for alleged infringement of a heater patent, have terminated in its favor. The decision of the United States Circuit Court of Appeals, at Chicago, the court of last resort in this case, was handed down by Judge Woods on the 3rd inst., and is against the complainants' contention that the scope of the Ferreira patent was broad enough to cover the special features embodied in the Cookson heater.

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For all purposes.

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Flange Plates, Ship Plates, Tank Plates, Steel Car Axles and Forgings of all kinds.

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Regenerative Gas Furnaces and Water Seal Gas Producers.

Producer Gas under Tubular Boilers, saving 20 per cent in fuel. NO SMOKE.

The A B C of Iron, Now 81.

At Reading, Pa., the court sustained the appeal of the Reading Iron Co. from the assessment of its property as made by the Board of City Assessors. The amount was $140,000. This the court reduced to $47,000

The Pennsylvania Steel Co. has just completed the last delivery on its 30,000 tons of steel rails for the Chinese Eastern Railroad, now building by the Russian Government, and it is understood that the Russian Government wants more American rails. This order amounted to about $500,000, and there was no profit in it except that it kept the works going. The company has also delivered 8,000 tons of steel rails in Australia and 2,000 in Jamaica.

The incorporation of the F. B. Shuster Co. at New Haven, Conn., indicates the steady expansion of the business of John Adt & Son since it was purchased by F. B. Shuster a few years ago. Because of the constantly increasing demands for the machinery manufactured, additional land has been purchased and it has been decided to erect a large brick building adjoining the present works. Excavation has begun.

The Tennessee Coal, Iron & Railroad Co. has just decided to put in two new blowing engines at its big Ensley furnaces. The engine house will have to be enlarged. This addition is in order that the four furnaces at Ensley can easily be kept in blast at one time.

The Harrison Safety Boiler Works, Philadelphia, report the following recent sales of Cochrane separators: Philadelphia (Pa.) Engineering Works, one 8-inch, two 6-inch and one 3½-inch horz.; De La Vergne Refrigerating Machine Co., New York City, one 6-inch oil-ammonia separator; Cheney Bros., South Manchester, Conn., one 8-inch horz; F. R. Dravo & Co., Pittsburg, Pa., one 4½-inch horz.; Massachusetts Institute of Technology, Boston, Mass., 8-in. horz.; Elmwood Mills, Providence, R. I., one 6-in. horz.; United States Gas Improvement Co., Philadelphia, three 5-inch, one 6-inch, and one 8-inch horz.; Kroeschell Bros., Chicago, Ill., one 8- inch horz.; Geo. E. Dixon, Chicago, 6-inch horizontal.; Arizona Copper Co., Ltd., Clifton, Arizona, one 5-inch horizontal; Mills, Horton & Reed, Providence, R. I., one 3-inch horizontal; Spring Garden Institute, Philadelphia, one 7-inch horz.; Fraser & Chalmers, Chicago, one 6-inch horizontal; and one 8-inch vertical; Long Island State Hospital, Kings Park, L. I., one 6-inch horz.; W. T. Hiscox & Co., New York City, one 4 inch horz.; Chas. Erith & Co., London, Eng., one 6-inch horz.; Lewis Metesser, New Orleans, La., one 8-inch and one 10-inch horz.; Union Restaurnt of the Pabst Brewing Co., Chicago, two 5-inch horz.; Atlantic Coast Line, Wilmington, N. C., one 3-inch horz.; Buerkel & Co., Boston, Mass., one 3-inch horz.; Coldwater (Mich.) Portland Cement Co., two 6-inch vert.; Eckhart & Swan Milling Co., Chicago, one 10-inch horz.; Cleveland (O.) Rolling Mill Co., six 8-inch, one 5-inch and one 4-inch horz.; Drew, Selby & Co., Portsmouth, O., one 6-inch horz.; Standard Plate Glass Co., Butler, Pa., one 10-inch horz.; Gillette-Herzog Mfg. Co., Minneapolis, Minn., one 5-inch horz.; East Jersey Water Works, Little Falls, N. J., two 8-inch vert.; Jas. T. Murray, Hartford, Conn., one 8-inch horz.; Denver Engineering Works, Denver, Col., one 3½-inch and one 4½-inch horz.; Cambria Iron Co., Johnstown, Pa., two 16-inch horz. and one 6-inch horz.; Oliver-Snyder Steel Co., Edith Furnace, Allegheny Co., Pa., one 6-inch horz.; Jordon, Marsh & Co., Boston, Mass., 5-inch vert.; Gloucester Water Works, Gloucester, Mass., 5-inch horz.; Anglo-Swiss Condensed Milk Co., Dixon, Ill., two 2-inch vert.; Brooklyn (N. Y.) Post Office, one 6-inch vert. and one 6-inch horz.; Shaefer Piano Mfg. Co., Riverview, Ill., one 6-inch vert.; Denver Engineering Works Co., Denver, Col., one 4½-inch horz.; Filer & Stowell Co., Milwaukee, Wis., one 10-inch horz.

The plant of the Morton Tin Plate Co., Cambridge, O., will soon place in position a 1,025-h. p. Corliss engine, the fly wheel of which will be 30 feet in diameter. It is made in Providence, R. I.

The employes in the foundry department of the Moline (Ill.) Plow Co. refused to work last week, acting in sympathy with a number of striking coremakers, who demand $1.75 per day. The molders refused to use cores made by non-union men. The strike affects 34 union molders, 5 apprentices and 30 foundry laborers.

The Fulton Steam Boiler Works, at Richmond, Ind., were recently sold at receiver's sale. John Hanford, of Chicago, bought in the plant for $13,280. It may be moved to Chicago.

The flanging department of the Central Iron & Steel Co., Harrisburg, recently burned, has been rebuilt with new steel building, and is in full operation again. All the mills of this concern are running full night and day.

The Leechburg Foundry & Machine Co., which is removing to the Monongahela Valley, near Hays Station, Pa., has

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made a contract for eight electric traveling cranes to be built for the new mills by the Wellman-Seaver Engineering Co., of Cleveland. It is intended to open the new mills about Jan. 1, with 300 workmen.

Pittsburg steel men, whose names are not yet announced, are reported to be negotiating for the Ohio Falls Iron Works, at New Albany, Ind., which they propose to reconstruct for the manufacture of bar iron. This plant has been inoperative since 1893, having suffered from the panic. It was afterward sold to mortgage creditors for $60,000, this amount being about one-fourth the plant's original cost.

Two car loads of gasoline engines were shipped last week to Yokohama, Japan, from Kansas City, Mo.

Four new soaking pits are being added at the South mill of the Lackawanna Steel Co., Scranton, Pa. Additional gas producing capacity will be provided also.

The Akron Steam Forge Co.'s plant at Elwood, Ind., has been sold and will be started up.

The Gracey-Woodward Iron Furnace, of Clarksville, Tenn., which was erected at a cost of about $350,000, with a capacity of 250 tons of pig iron daily, is to be sold Nov. 5 to satisfy a mortgage held by the Manhattan Trust Co., of New York, for $100,000. This furnace has been idle for nearly two years.

Repairs to the furnaces and rail mill of the Maryland Steel Co., at Sparrow's Point, Md., are completed and when a sufficient supply of ore is accumulated the stacks will go in.

It is reported that Gen. W. P. Snyder has succeeded in locating the German-American Steel Ball Works at Lansford, Carbon Co., Pa., where the machinery will be put in an abandoned rolling mill.

The Kilbourne & Jacobs Co., Columbus, O., manufacturers of mining machinery, shovels, steel barrows, etc., reports increasing trade abroad. A special representative of the company went to Brazil last year and good returns have been realized.

In referring last week to the addition recently built by the D. E. Whiton Machine Co., the plant was located at Stafford, Mass. The types should have read New London, Conn.

Furnace No. 7 of the Thomas Iron Co., at Alburtis, Pa., is being prepared for operation.

The Battle Creek Steam Pump Co., Battle Creek, Mich., has increased its stock from $100,000 to $200,000, issued and fully paid The company has doubled the size of its foundry, put in a pneumatic traveling crane, built a new brass furnace, core ovens and added new machine shop equipment.

Bolckow, Vaughan & Co., Middlesbrough, Eng., will equip a new beam mill, and some contracts are being placed in Pittsburg.

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